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HARRAP'S NEW GEOGRAPHICAL SERIES

AFRICA

BY

L. S. SUGGATE

B.Sc. (Lond.)

UNIVERSITY OF LONDON TEACHER'S DIPLOMA
UNIVERSITY OF LONDON GEOGRAPHY DIPLOMA
SENIOR GEOGRAPHY MASTER ST CLEMENT DANES
HOLBORN ESTATE GRAMMAR SCHOOL

*WITH MANY ILLUSTRATIONS MAPS
AND DIAGRAMS*

FOURTH EDITION REVISED



GEORGE G. HARRAP & COMPANY LTD
LONDON SYDNEY BOMBAY TORONTO

First published June 1929
by GEORGE G. HARRAP & Co. LTD.
182 High Holborn, London, W. C.1
New edition, revised, published September 1933
Third edition, revised, published August 1940
Reprinted May 1948
Fourth edition, revised, published January 1949
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PREFACE TO THE FIRST EDITION

THIS book is designed to meet the needs of those who are carrying the study of the geography of Africa beyond the Matriculation stage, and it is hoped that it will prove useful not only to students preparing for subsequent university examinations, but also to the increasing number of those interested in the subject for other reasons.

That rapid changes have taken place and are still taking place in Africa is common knowledge, but in order to appreciate their extent and variety it is necessary to consult many books and periodicals that are often not generally accessible. Moreover, the conditions of economic and social developments now in progress are a proper field for geographical study. In the following pages the attempt has been made to bring together much scattered material and to present a comprehensive and balanced study of Africa in the light of modern geographical thought. The economic aspect has received most emphasis, but this seems to be of greatest importance in dealing with a developing continent like Africa. Effort has been made, however, to give adequate treatment to physical and regional geography and to suggest the historical and human background of "changing Africa." Western Europe is largely interested in Africa as a source of raw materials and as a market for manufactured goods, and the impact of Europe upon Africa has raised many problems, not the least of which is the future of the negro race in the modern world. The importance of some parts of the continent is due to the presence of great resources in mineral wealth, and it would be interesting to speculate upon

AFRICA

what would happen to such regions should their mineral wealth become exhausted. It is within the province of geography to provide the data for the consideration of problems such as these, and it is hoped that it will be found that this aspect of the study of Africa has not been neglected.

Among the difficulties that have been met with are the presentation of trade statistics and the spelling of place-names. Import and export values are given, as far as possible, for the domestic trade, excluding such items as bullion and specie imports and *entrepôt* trade, except that where the latter is important it is noted in the text. Currency fluctuations, moreover, have been considerable in the last few years, and comparative figures tend to be somewhat misleading; it has been thought best, therefore, to indicate the basis of evaluation when foreign currencies have been converted into sterling. With regard to the spelling of names, it seemed desirable, pending the more general adoption of the standardized spelling of the Permanent Committee on Geographical Names, to use the spelling commonly to be met with in atlases that the student is likely to consult.

The author is particularly indebted to his wife for her invaluable co-operation, and to the Editor of this series, to Mr L. B. Cundall, and to Mr J. A. Mortlock for much valuable help with the text. He has freely consulted such standard books as *A History of the Colonisation of Africa by Alien Races*, by the late Sir Harry Johnston, and *The Oxford Survey of the British Empire*, and books on special areas, such as G. C. Dudgeon's *Agricultural and Forest Products of British West Africa*, as well as official publications like the Peace Handbooks, the *Year-book of the Union of South Africa*, the *Nigeria Handbook*, the *Gold Coast Annual Report*, the *Year-book of the Colony of Southern Rhodesia*, Colonial Office Reports, and Department of Overseas Trade Reports.

PREFACE

Advantage has been taken of French official and unofficial publications, of current periodicals, and of the *South and East African Year Book*, as well as of articles in the more technical journals. For climatic material free use has been made of Kendrew's *The Climates of the Continents*.

Finally, the author desires gratefully to acknowledge the permission of Sir Henry Lyons, Dr H. E. Hurst, and the representatives of various Governments to make use of published diagrams and maps, and the courteous assistance he has received at the offices of Colonial Governments in London and from the officials at the Library of the Imperial Institute. He is much indebted, also, to those who have lent photographs for reproduction.

L. S. SUGGATE

March 1929

PREFACE TO THE THIRD EDITION

THE third edition of this text-book has been called for during the first year of the war which began in September 1939. This conflict has already had important repercussions in Africa, and its long-range results may well have profound effects on the development of the continent and the future of the Africans. In revising the book it has been felt that the only practicable course was to bring the study down to the year 1938, and so try to present the picture as it was in the year immediately preceding the war. This has—as far as possible in the existing conditions—been done, and the opportunity has been taken of revising thoroughly many of the maps, of inserting several new ones, and of adding a short chapter in which some of the more outstanding African problems are briefly set out.

In this connexion it is desirable to refer the student to a volume of considerable importance—*An African Survey*, edited by Lord Hailey and published in 1938. This book surveys—largely from the official standpoint, and with a wealth of references—the human geography of Africa south of the Sahara, and, while it contains much that is of special interest to the administrator and the anthropologist, it is as a whole, from the point of view of the geographer, a most important contribution to the literature dealing with Africa, since it provides a survey of the human conditions in which the geographical factors operate.

L. S. SUGGATE

July 1940

INTRODUCTION TO THE FOURTH EDITION

THE call for a new edition of this book has come at a time when it is not possible to bring it 'up to date.' It would be unwise to attempt to do so in view of the changes that have taken place and are taking place and the difficulty of assessing their long-term significance. Large areas of Africa were the scene of military operations during the Second World War: Madagascar was fought over; Abyssinia and the adjacent territories were the field of remarkable highland campaigns; the tide of war swept over the north of Africa to within a few miles of Alexandria; even the difficulties of the Sahara Desert did not prevent important enterprises. But the world upheaval has had extensive repercussions in every part of Africa; it has not only disturbed the economy of every territory, but has brought about much political and social upheaval. The purpose of this short introduction is to indicate to the student some of the more important developments of the last few years, developments that he may wish to follow up. Apart from this, there have been only a few changes in the text of the Third Edition, designed to make it conform to some extent to the new conditions. No attempt has been made to modify the statistics, for not only are recent ones difficult to obtain, but they may reflect temporary conditions, and may be very misleading in view of prices, controls, and currency changes.

Former *Italian Territories* in Africa are at present politically in the 'melting-pot.' No decisions have yet been taken; some at least are likely to become 'trusteeships' while it may be noted that Abyssinia, now again an independent country, has made claims upon Eritrea and hopes for other adjustments of its boundaries.

In the *Nile Lands* the economic and social upheaval arising from the War is well seen, as also is the preoccupation

AFRICA

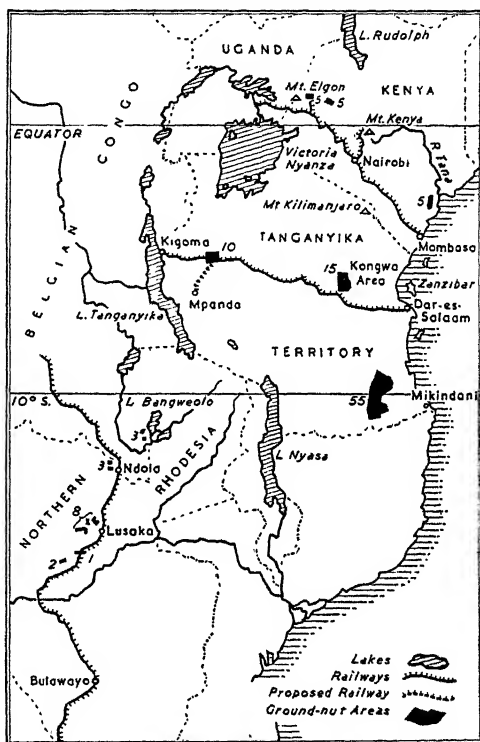
of Egypt with the problem of the Nile waters. Politically, the British Government has undertaken the task of withdrawing its forces, kept in Egypt under the 1936 treaty, from that country, but has been unable to agree to the demand made, under the slogan of "the unity of the Nile valley," to leave to Egypt the condominium of the Anglo-Egyptian Sudan, where British policy is designed to promote such development as will enable that varied territory to decide its own political future. In Egypt, where the Second World War led to a great reduction in the area under cotton, though production is rising again, the population grows apace and is now estimated to be about 17 $\frac{3}{4}$ millions, and the problem of the control of the Nile waters is of increasing urgency. A project to harness for hydro-electric power the Upper Nile at a point below the Ripon Falls is being investigated in consultation with the Egyptian Government, with a view to making it part of a larger scheme which would somewhat raise the level of Lake Victoria and, combined with a dam at the exit of Lake Albert, provide a greater and better-regulated flow of water down the Nile. Egypt also desires a canal to be cut through the sudd region between Juba and Malakal, the construction of a dam (greater than that at Aswan) at Merowe, near the Fourth Cataract, and a dam to raise the level of Lake Tana. This is part of the background of the claim for the control of the Nile valley.

West Africa, during the Second World War, was of great importance for its supplies of cocoa, vegetable oils, and oil seeds, and even its small production of rubber was stimulated. The importance of palm-oil and -kernels and groundnuts at the present time is so great that the British Government is actively promoting greater production; in particular, a project for the large-scale mechanized production of groundnuts in the Gambia is contemplated. In Nigeria increased production is hampered by inadequate transport facilities; the main railway from Lagos to Kano is functioning under great difficulties, and there is much congestion at the port of Lagos. In view of the efficient methods of palm-oil production in the Netherlands East Indies, it is being seriously considered in Nigeria that it may be better long-term

INTRODUCTION

policy to concentrate on palm-kernel production, as the West African oil-palms generally have a relatively thin pericarp (from which palm-oil is obtained) and native methods of extraction are usually primitive.

In *East Africa* there have been some significant developments. Kenya Colony's white population is now estimated at 33,000, and the other sections of the population have also increased. The War particularly stimulated the cultivation of pyrethrum, greatly in demand for the protection of troops against malaria. The colony is also included in the important scheme for the large-scale mechanized production of ground-nuts in East Africa, operations in connexion with which have been begun in Tanganyika Territory, where the white population is now estimated to be



SOME EAST AFRICAN DEVELOPMENTS

The figures give the number of units of approximately 30,000 acres each that it is proposed to develop.

nearly 15,000. The whole scheme, which includes certain areas in Northern Rhodesia, is designed to relieve within the near future the world shortage of fats; it envisages 107 units of 30,000 acres each to be cleared by modern methods; tractor-ploughing, -planting, and -cultivation are to be employed as

AFRICA

well as the mechanical lifting of the crop. The bulk of the labour is to be African (involving the difficult problem of training), and the scheme is to be brought within the broad policy of developing the country in the interest of the African. The Report (*A Plan for the Mechanized Production of Ground Nuts in East and Central Africa*, Command Paper 7030, 1947) has much geographical interest, as it discusses problems of labour, health, soil, soil conservation, climate, rotation of crops, tsetse control, and transport. The initiation of the scheme has met with great difficulties, and only 7500 acres (out of a contemplated 150,000 acres) were planted in the first season; this was in the Kongwa area some 200 miles west-north-west of Dar-es-Salaam. Not the least of the difficulties was that of transport, a fundamental problem in all African development. The harbour of Dar-es-Salaam is inadequate for its new responsibilities, and it may be noted that a new port, Mikindani, is to be developed to serve the larger area in the south of the Territory which is included in the scheme. Tanganyika Territory is now the world's leading producer of sisal, and the mineral wealth is receiving much attention. Diamond production has increased, and a branch railway line is to be built to Mpanda, south-east of Kigoma, to allow the development of important lead deposits; this area also has gold and silver resources. While political integration of the three territories of East Africa is not contemplated, a closer economic union may well develop under the auspices of the Central Legislative Assembly of East Africa, inaugurated in April 1948. It may also be noted that Tanganyika is now a United Nations Trust Territory.

In the *Rhodesias* there have been substantial developments. The white population of Northern Rhodesia is now estimated as nearly 22,000, and the production of copper in the Ndola area exceeds that of the adjacent Katanga district of the Belgian Congo. Shortage of railway trucks and congestion at the port of Beira again illustrate the importance of transport in African development. Mechanized ground-nut production is contemplated in the Lusaka, Ndola, and Lake Bangweolo areas.

INTRODUCTION

The white population of Southern Rhodesia is now approaching 100,000. There has been considerable agricultural expansion; the annual production of coal at Wankie has reached $1\frac{1}{2}$ million tons, and the production of other minerals remains important. A tendency to develop secondary industries is illustrated by a modern State iron-and-steel plant at Que Que and a small cotton-spinning industry at Gatooma.

There would appear to be a lack of balance in the economy of the Rhodesias, especially in that of Northern Rhodesia, owing to agricultural development not keeping pace with other production. Northern Rhodesia's exports in 1947 totalled £29 million, and included copper to the value of £26 million; this expansion of mining attracts labour from other occupations. Southern Rhodesia contemplates an irrigation scheme on the Sabi river to bring half a million acres under cultivation; it also is considering a large hydro-electric power scheme on the Zambezi (at the Kariba gorge) which would mainly serve the processing of ores and necessarily make claims on the limited labour supply. Transport costs to the inadequate ports of Beira and Lorbita Bay present a serious economic difficulty at the present time.

In the *Union of South Africa* the world-wide financial and currency difficulties have ensured the prosperity of the Rand gold-mines, and development work is proceeding in a new field in the Odendaalsrust area of the Orange Free State; this lies some 40 miles west-south-west of Kroonstad. Drilling is going on over a large area of the northern Free State, as it is thought that gold is widely distributed there. Great attention is being paid in the Union to problems of water-supply and irrigation, especially in the Orange Free State; the silting up of reservoirs, overstocking on the veld, the cultivation of steep slopes, and other bad farming practices have led to Government intervention to ensure soil conservation. The Second World War has given a fillip to secondary industries, illustrated particularly by the increase in iron and steel output, chiefly in the Pretoria area, to an annual production of about half a million tons; new works and a greatly increased production are planned.

AFRICA

The European population is now estimated at 2,335,000 out of a total population of 11¼ millions.

Conclusion. In connexion with the various problems discussed in the last chapter of the book, a few developments may be noted. Some changes have been stimulated by the Second World War, particularly in the groundnut scheme, which for its size and nature is a landmark in tropical African development; it will be watched carefully not only because of its economic importance, but because of its repercussions on the development of the African. There are signs of increasing international co-operation in connexion with tropical African development; thus labour problems have been discussed by British, French, and Belgian administrators. A valuable anti-locust campaign has recently been completed on a co-operative basis in Egypt, the Sudan, Ethiopia, and East Africa with very great success. The British Government's Colonial Development and Welfare Fund is being employed in the African colonies, and important developments in education, especially in higher education, are taking place in Uganda, Nigeria, and elsewhere. Political development is also going on, and new responsibilities are being given to African local authorities in Uganda and other colonies; the Gold Coast has become the first British colony in Africa to be given a constitution in which there will be a majority of elected Africans in its legislature, while a considerable advance in the development of indirect rule has taken place in northern Tanganyika Territory.

L. S. SUGGATE

October 1948

CONTENTS

CHAPTER	PAGE
I. GENERAL PHYSICAL GEOGRAPHY	19
Relief and Structure, <i>p.</i> 20. Drainage, <i>p.</i> 27. Lakes, <i>p.</i> 33. Climate, <i>p.</i> 33. Vegetation, <i>p.</i> 45. Animal Life, <i>p.</i> 50.	
II. POPULATION AND ECONOMIC REGIONS	53
Peoples, <i>p.</i> 53. European Influence, <i>p.</i> 56. Density of Population, <i>p.</i> 58. Modern Development, <i>p.</i> 61. Economic Regions, <i>p.</i> 63. Overseas Communications, <i>p.</i> 69.	
III. NORTH-WEST AFRICA AND THE SAHARA	71
General Considerations, <i>p.</i> 71. Morocco, <i>pp.</i> 82-89: The Tangier Zone, <i>p.</i> 82; The Spanish Zone, <i>p.</i> 83; French Morocco, <i>p.</i> 85. Algeria, <i>p.</i> 89. The Regency of Tunisia, <i>p.</i> 95. The French Sahara, <i>pp.</i> 99-106: Mauritania, <i>p.</i> 102; Southern Algeria, <i>p.</i> 103; The Niger Colony, <i>p.</i> 104; The Chad Colony, <i>p.</i> 104; Saharan Routes, <i>p.</i> 105. Libya, <i>pp.</i> 106-109. Rio de Oro, <i>p.</i> 109. The Islands of North-west Africa, <i>pp.</i> 110-114: The Azores, <i>p.</i> 110; The Madeiras, <i>p.</i> 111; The Canary Islands, <i>p.</i> 112.	
IV. EGYPT AND THE ANGLO-EGYPTIAN SUDAN	115
General Considerations, <i>pp.</i> 115-130: Physical Conditions of the Nile Basin, <i>p.</i> 116; The <i>Régime</i> of the Nile, <i>p.</i> 120; Irrigation and Agriculture, <i>p.</i> 125. The Kingdom of Egypt (Misr), <i>p.</i> 130. The Anglo-Egyptian Sudan, <i>p.</i> 140.	
V. THE EASTERN HORN	150
General Considerations, <i>p.</i> 150. Former Italian East Africa, <i>p.</i> 153: Abyssinia (Ethiopia), <i>p.</i> 155; Eritrea, <i>p.</i> 157; Italian Somaliland, <i>p.</i> 159. French Somaliland, <i>p.</i> 161. British Somaliland, <i>p.</i> 163.	
VI. WEST AFRICA	165
General Considerations, <i>p.</i> 165. British West Africa, <i>pp.</i> 176-194: The Gambia, <i>p.</i> 176; Sierra Leone, <i>p.</i> 178; The Gold Coast, <i>p.</i> 181; Togoland, <i>p.</i> 187; Nigeria, <i>p.</i> 187; The British Mandated Cameroons, <i>p.</i> 194.	

AFRICA

CHAPTER

PAGE

French West Africa, *pp.* 194-203: Senegal, *p.* 196; The Colony of French Sudan, *p.* 198; The Niger Colony, *p.* 200; French Guinea, *p.* 200; The Ivory Coast, *p.* 201; Dahomey, *p.* 202; French-mandated Togoland, *p.* 203. Portuguese Possessions, *p.* 204: Portuguese Guinea, *p.* 204; The Cape Verde Islands, *p.* 204. Liberia, *p.* 204. The Gulf Islands, *p.* 206.

VII. CENTRAL AFRICA 207

General Considerations, *p.* 207. French Equatorial Africa, *pp.* 213-215: French-mandated Cameroons, *p.* 215. Spanish Guinea, *p.* 216. The Belgian Congo, *p.* 216. Angola, *p.* 226.

VIII. EAST AFRICA 229

General Considerations, *p.* 229. Uganda, *p.* 235. Kenya, *p.* 239. Tanganyika Territory, *p.* 245. Zanzibar, *p.* 249.

IX. ISLANDS OF THE INDIAN OCEAN 252

Madagascar, *p.* 252. Mayotte and the Comoro Islands, *p.* 261. The Mascarene Islands, *pp.* 262-267: Réunion, *p.* 262; Mauritius, *p.* 264; Rodriguez, *p.* 267; Chagos Archipelago, *p.* 267. The Seychelles, *p.* 267.

X. SOUTH AFRICA 269

General Considerations, *p.* 269. Mozambique, *p.* 281. Nyasaland, *p.* 286. The Rhodesias, *pp.* 289-300: Northern Rhodesia, *p.* 290; Southern Rhodesia, *p.* 293. Bechuanaland Protectorate, *p.* 300. South-West Africa, *p.* 301. The Union of South Africa, *pp.* 305-354: The Transvaal, *p.* 337; The Orange Free State, *p.* 340; Natal, *p.* 341; The Cape of Good Hope, *p.* 346; The Transkei Territories, *p.* 351; Swaziland, *p.* 351; Basutoland, *p.* 353; The Trade of the Union of South Africa, *p.* 354. The Islands of the South Atlantic, *pp.* 355-357: Ascension, *p.* 355; St Helena, *p.* 356; Tristan da Cunha, *p.* 356; Bouvet Island, *p.* 357.

XI. CONCLUSION 358

White Administration, *pp.* 359-363. Native Farming, *pp.* 364-366. Soil Erosion, *pp.* 366-369. Some Effects of European Activities, *pp.* 369-372. Other Problems, *p.* 372.

STATISTICAL APPENDIX 375

INDEX 379

ILLUSTRATIONS

	PAGE
The Cape of Good Hope	<i>Frontispiece</i>
Farm in the Inyanga District, Southern Rhodesia	22
Sunset on Lake Naivasha, Rift Valley, Kenya	24
Junction of the Blue and White Niles	31
Cattle on Farm near Gwelo, Southern Rhodesia	48
Baobab, Sudan	49
Herd of Elephant	51
In Zanzibar Town	55
Manganese-mining, Insuta, Gold Coast	57
Donkey carrying Load of Hay	61
Canoes on Lower Tana River, Kenya	62
The Sennar Dam	65
Rubber Plantation in the British-mandated Cameroons	66
Kilindini Harbour from the Mainland	68
Irrigation Tank and Date-palms, Figig	88
The Wadi Saura and Kerzaz Oasis, to the South of Beni Abbes	100
The Oasis of In Salah	103
Dinka Village in the Sudd Region	117
Gum-collecting in Kordofan	124
River Transport in the Anglo-Egyptian Sudan	137
Irrigation Cotton in the Gezira—Second Watering	145
Scene in Omdurman	147
Wharf at Cotonou, Dahomey	168
Old Selwyn Market, Accra	172
Trade School, Gold Coast	173
The Beach at Accra	182
Mahogany Logs	189
Coconut Plantation near Lomé, Togoland	203
Congo Village	212
Young Oil-palm	218
	15

AFRICA

	PAGE
Copper-mine, Kambove	220
Sisal	234
Cotton-picking, Busoga District, Uganda	236
View of Part of Kampala	238
Granite Kopje, Southern Rhodesia	270
Brick Huts of Native Compound, Wankie Coalfield	279
Interior of Elliptical Temple, Zimbabwe	298
Donkey Transport	325
Cathedral Spires, Drakensbergen	340
Zulu Huts	343
Pondo Huts	352
Busoga Women with their Hoeing-sticks, Uganda	364
Gully Erosion on Farm Land, Southern Tanganyika Territory	367
Natives leaving a Gold-mine in the Rand	371

MAPS AND DIAGRAMS

Orographical Map	21
The Great Rift Valley	23
Section across Africa in the Latitude of the Equator	25
The Chief Areas without Drainage to the Sea	30
Ocean Currents affecting the Climate of Africa	34
January Sea-level Isotherms	37
July Sea-level Isotherms	37
January Rainfall	38
July Rainfall	38
Approximate Area over 70° F. in January—Actual Temperature	40
Approximate Area over 70° F. in July—Actual Temperature	40
Length of the Dry Season	41
Mean Annual Rainfall	44
Natural Vegetation—Generalized	47
Density of Population	59
Major Economic Regions	64
Chief Air Routes, 1948	70A
Generalized Physical Features of the Atlas Region	72

MAPS AND DIAGRAMS

	PAGE
Morocco	84
The Algerian Tell and the High Plateau	90
Density of European Population in Algeria	94
Tunisia	96
The Sahara	105
Libya	107
Average Discharge of the Nile, 1912-26	121
Volume discharged by the Nile at Cairo, 1921	122
Sections across the Nile Valley	126
The Lower Nile	127
The Sennar Dam	128
Small Village of Lower Egypt	131
The Position of Cairo	135
The Anglo-Egyptian Sudan	141
Cotton Areas in the Sudan	144
The Position of Khartum	146
The Abyssinian Area	154
Former Italian East Africa	160
The Somali Peninsula and Socotra	162
Lagoon- and Creek-fringed Coast West of the Niger Delta	167
The Coast-lands of Sierra Leone	179
The Gold Coast—Important Vegetable Products	183
The Gold Coast—Minerals and Communications	185
Nigeria—Vegetation and Chief Vegetable Products	190
Nigeria—Chief Cotton Areas	191
Nigeria—Chief Minerals and Railways	192
French West Africa	195
Senegal and the Gambia	197
The Niger Bend	199
Capture of Lake Chad Drainage by the Benue	209
The Belgian Congo and French Equatorial Africa	217
Cotton-growing Districts of the Belgian Congo	219
The Lower Congo	222
Railway Rivalry in Central Africa	223
Angola and the Katanga Area	227
Regions of East Africa	231
The Kenya and Uganda State Railway	239
Mombasa Island	243
	17

AFRICA

	PAGE
Tanganyika Territory	247
Madagascar—Vegetation	255
Madagascar—Minerals	259
Madagascar—Towns and Communications	260
Islands of the Indian Ocean	263
Mauritius	265
The Victoria Falls	272
The Railway Nodalilty of Beira	286
Northern Rhodesia	291
Southern Rhodesia	294
South-West Africa	302
Generalized Section North from Mossel Bay	308
Generalized Section in the Latitude of Pietermaritzburg	308
Union of South Africa—Mean Annual Rainfall	312
Union of South Africa—Proportion of Rain falling in Summer	312
Union of South Africa—Mean Annual Number of Thunder- storms	313
Union of South Africa—Vegetation	315
Union of South Africa—Location of Irrigation Schemes	319
Union of South Africa—Maize Areas	320
Union of South Africa—Tobacco, Vines, and Sugar Areas	321
Union of South Africa—Cotton Areas	322
Gold—Union Production in Relation to World Production	328
Union of South Africa—Distribution of Chief Minerals other than Coal	330
Union of South Africa—Coal	332
Union of South Africa—Principal Railways	334
The Witwatersrand	338
Natal	342
Features of the Cape Province	345
The Immediate Hinterland of Cape Town	347

AFRICA

CHAPTER I

GENERAL PHYSICAL GEOGRAPHY

THIS vast, compact continent, covering an area of approximately 11,500,000 square miles (about three times that of Europe), is joined to Asia by a relatively narrow isthmus. Until this isthmus was cut by a canal in 1869, Africa, situated between the Atlantic and Indian Oceans, and with great latitudinal extension, constituted the most serious obstacle to the sea-borne trade between Europe and the East which sprang up in the years following the historic voyage to India made by Vasco da Gama in 1497. It is an illuminating comment on the general geography of Africa that for more than three centuries after this event, in spite of many trading stations on its coast, only insignificant progress was made in the work of opening up the interior of the continent. Africa was, in fact, a backwater of the earth's surface, the interior of which awaited the explorers of the nineteenth century and the subsequent interest of several Great Powers before its surface could be mapped with reasonable accuracy and its economic possibilities determined. That knowledge of the continent should so long have been confined in the main to coastal areas arose to a large extent from its general physical conditions, its build, drainage, climate, deserts, forests, diseases, and difficult communications.

Cape Blanco, in Tunis, 37° 20' N., is the most northerly point, and Cape Agulhas, 34° 40' S., is the most southerly point, so that the equator divides the continent almost equally as regards mere latitudinal extension; but from the point of view of area, owing to the great westerly projection lying about the Tropic of Cancer, there is roughly twice as much of the continent north of the equator as there

AFRICA

is south of it. Nevertheless, arising from this approximately equal latitudinal division, there is considerable similarity in the arrangement of climatic regions north and south of the equator. It is an important feature of Africa that no part reaches the essentially temperate latitudes—that is, those latitudes in which cool winters occur at sea-level. It will be noted from the map that the bulk of the continent lies in east longitude, and that the prime meridian passes through the middle of the Atlas region, cutting the coast of West Africa just east of Accra, in the Gold Coast Colony.

The coast is very regular in outline, and there is a noteworthy absence of peninsulas and arms of the sea. Apart from the Gulf of Guinea, which is hardly a gulf in the ordinary sense of the term, and the Gulf of Suez in the north-east corner, the only prominent openings are the Gulfs of Gabes and Sidra in the north, which can scarcely be described as openings that invite penetration to the interior. The shape of Africa, indeed, neither permits the penetration of oceanic influences nor that of ships, the latter disability being aggravated by the general absence of good harbours on the growing coastal plains.

RELIEF AND STRUCTURE

Africa is relatively simple in shape, in relief, and in structure. The narrow continental shelf is related to the steep face which the continent generally presents to the sea and the faulting that has produced its general shape. Not only does the 100-fathom line closely preserve the shape of Africa, but this is true also of the 1000-fathom line, suggesting that Africa has had a prolonged existence without serious disturbance.

The orographical map shows that, apart from the young folded system of the Atlas, Africa consists essentially of a great plateau with considerable diversity of relief. The structural unity of Africa is illustrated by the extensive outcropping of the ancient crystalline foundation of the continent over large areas both north and south of the equator. A broad distinction in altitude may be made, however,

GENERAL PHYSICAL GEOGRAPHY

between the two limbs of the continent lying one on each side of an irregular line drawn from Benguela north-eastward round the southern border of the Congo basin and along the western edge of the Lake Plateau to a point a

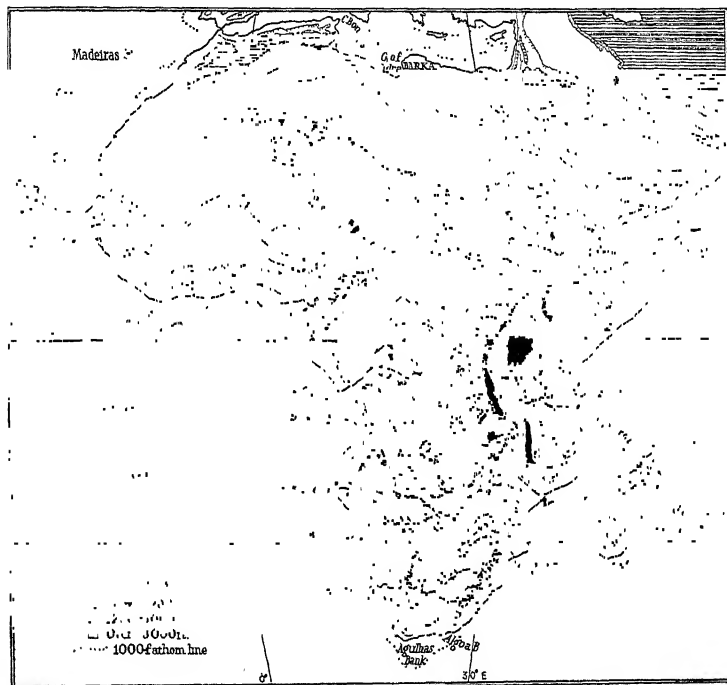


FIG. 2. OROGRAPHICAL MAP

The contours selected bring out the general character of the continent and the steepness with which it rises to the ocean.

little south of Suakin on the Red Sea. The northern limb has an average elevation far below 3000 feet, while the southern extension considerably exceeds that height. Basins or depressions characterize the interior of the continent as a whole, and there is a frequent occurrence of a higher rim near the coast that has prevented, and still prevents, easy communication with the interior.

AFRICA

The higher parts of the northern limb very largely consist of ancient crystalline or igneous rocks such as the granitic plateau regions of Ahaggar, Tasili, Tibesti, and Dar Fur. This is true also of the highlands that lie in the hinterland of the Guinea coast and along the northern rim of the Congo basin. Sometimes relatively recent volcanic rocks are superimposed, as in some of the peaks of Dar Fur and more notably in the Peak of Cameroon, which attains a height of



FIG. 3. FARM IN THE INYANGA DISTRICT, SOUTHERN RHODESIA

This is toward the high eastern border of Southern Rhodesia, showing high, open plateau country.

High Commissioner for Southern Rhodesia

more than 13,000 feet, associated with which are the volcanic islands of Fernando Po, Principe, and São Thomé. Otherwise Primary rocks prevail except where a relatively recent extension of the sea is indicated by a large area of Cretaceous and Tertiary rocks stretching from the Moroccan Sahara eastward to the Lower Nile and again by the Senegal and Gambia and round the Middle Niger. A series of large depressions is a prominent feature of this northern plateau. The depressed areas round Shott el Jerid in Tunis and the Tuat oases have no outlet to the sea, as is also the case with the vast basin of Lake Chad, which is now probably only a remnant of a larger inland lake. The lakes by the Middle Niger (*e.g.*, Lake Debo) suggest a similar basin now drained

GENERAL PHYSICAL GEOGRAPHY

by an active river, the Lower Niger, that cut back from the Gulf of Guinea through the plateau rim; and the great swamps of the Bahr el Ghazal in the Anglo-Egyptian Sudan record the comparatively recent draining of a lake by the Nile. Where the Congo falls to the Atlantic, in its lower course between Leopoldville and Matadi, by a relatively narrow cutting in the rim of Central Africa, the rapids indicate the relatively recent draining of a great inland lake round the Middle Congo, the basin of which is plainly brought out by the orographical map.

The southern limb of the plateau reproduces many features of the northern, though at a considerably higher elevation and with some special features of its own. The high rim can be traced through Namaqualand and Damaraland northward to the Bihé plateau, round through the Katanga district of the Upper Congo, through the east of Rhodesia to the Drakensberg and Nieuwveld Mountains.

The rocks are largely ancient sedimentary rocks, often sandstones and shales, but there are enormous areas of igneous rocks, both intrusive and volcanic, of widely varying age. The great band of granite, gneiss, and schists, for example, that covers immense areas in the southern part of the northern plateau reappears to the south of the Congo basin in Mashona-

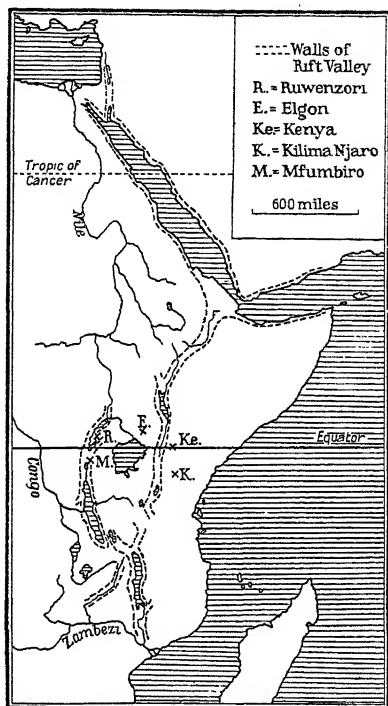


FIG. 4. THE GREAT RIFT VALLEY

Except for Ruwenzori, the peaks shown are volcanic.

After Professor J. W. Gregory

AFRICA

land and Matabeleland and south of the Limpopo, as well as in the high rim near the west coast. Much of this is metalliferous, especially in copper, and gold occurs in quartz veins. The rich gold-bearing 'banket' of the Rand, however, is an ancient conglomerate. Volcanic activity has been pronounced at many periods—the Kimberley diamonds, for



FIG. 5. SUNSET ON LAKE NAIVASHA, RIFT VALLEY, KENYA
Note the flat floor in this part of the Rift Valley and the escarpment in the background.

Information Office of H.M. Eastern African Dependencies

example, occur in ancient volcanic 'pipes,' while the Victoria Falls on the Zambezi are due to a belt of Tertiary basalt.

Two important basins due to depression are found in this southern plateau. The Ngami basin, in the lowest part of which are the Makarikari Salt-pans, is covered with younger rocks derived from the surrounding highlands, and is now being tapped by a tributary of the Zambezi. Farther south, the Karoo basin, of greater elevation, and extending from the Nieuwveld Range to the Vaal, is drained by the Orange; it is a gentle depression in the rocks of the plateau.

The lofty eastern part of the plateau includes the Lake Plateau and the Abyssinian Highlands. This region is specially marked by the Great Rift Valley, a structural

GENERAL PHYSICAL GEOGRAPHY

feature formed by the subsidence of a long tract of the earth's crust between two parallel sets of faults. This Rift Valley starts in Palestine, where it is occupied by the Jordan and the Dead Sea, passes down the Red Sea, turns south-westward through Abyssinia, where it is marked by the Hawash river and Lake Abaya, and continues by Lake Rudolf through Kenya Colony. It seems probable that the continuity is broken in Tanganyika Territory, but the trench reappears by Lake Nyasa and in the Shiré valley. From the northern end of Lake Nyasa a branch passes north-

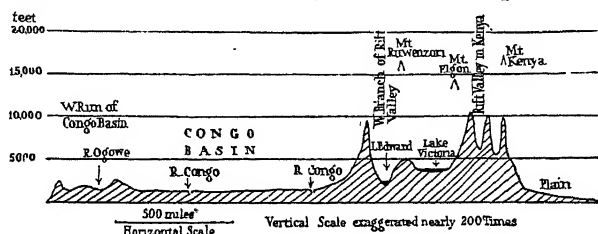


FIG. 6. SECTION ACROSS AFRICA IN THE LATITUDE OF THE EQUATOR

Note the low plateau character of the Congo basin and the two branches of the Rift Valley. The volcanic peak of Kenya rises to the east of the Rift Valley. Lake Edward is actually just south of the equator.

westward through Lake Tanganyika, and then continues northward to Lake Albert. This subsidence has been unequal in different parts, and the steep, cliff-like walls of the Rift Valley are not everywhere very obvious, although they are very well marked on the shores of the lakes. The mountainous confining walls are a striking feature of the topography in Kenya. Associated with this great series of fractures were enormous volcanic outpourings, especially to be seen in a great area lying east of Lake Victoria, where the volcanic peaks of Elgon and Kenya occur. Superimposed on the ancient rocks so characteristic of Africa is the great basaltic area of the Abyssinian Highlands, a large part of which reaches over 10,000 feet. Lake Victoria is in the plateau block left between the eastern and western branches of the Rift Valley, and is in a relatively shallow depression, not a fault valley. The plateau of the Somali peninsula is of the same ancient formation.

AFRICA

The plateau of which Madagascar is an isolated and dissected portion falls to the Indian Ocean by a series of step faults, and the coast is marked by a continuous plain of varying width from Natal to Cape Guardafui, in which relatively recent deposits occur. This is one of the few extensive belts of coastal plain in Africa.

It is clear from the foregoing that Africa is built mainly of an old crustal block or shield land of early geological date, and that the great Tertiary movements that are so prominently shown in the mountain belts of the northern continents affected it but little. Pressed against the southern edge are some minor fold mountains—*e.g.*, the Zwarte Bergen, the Lange Bergen, and the Olifants Mountains. The Atlas Mountains of the north-west are geologically connected with the great young folded mountains of Europe. Here two main ranges can be distinguished. The more prominent is the Great or Snowy Atlas in Central Morocco, where a maximum elevation of more than 14,000 feet is reached; this range, like the parallel Anti-Atlas to the south, is abruptly broken by the Atlantic to the west. Eastward the range continues as the Saharan Atlas, and terminates at Cape Bon in Tunisia, which points to an earlier connexion with the fold mountains of Sicily and Italy. The northern ranges converge eastward on the southern ranges, but in the west the Tell or Maritime Atlas, after running parallel to the Mediterranean coast, bend northward through Er Rif, and form an obvious portion of a great loop, the rest of which is seen in the Sierra Nevada of South Spain and in the Balearic Islands. The northern ranges fall by terraces to the coast, where, however, a low, broken coastal range can be distinguished, especially in Algeria.

Between these great parallel ranges, which in general are of Jurassic limestone and younger rocks, lies the Plateau of the Shotts, a series of depressions of internal drainage and varying elevation, with sheets of sand and salt lakes. An ancient core is sometimes in evidence, and in Morocco there is a considerable development of Archæan and Primary rocks, as well as of granite and ancient eruptive rocks. Relatively recent volcanic activity is indicated along the Mediterranean

GENERAL PHYSICAL GEOGRAPHY

coast, and again in the islands of the west. On the south the Atlas fall steeply to a discontinuous depression indicated by the Wadi Draa and the depressed area round the Shott el Jerid.

Apart from the Atlas region and the folded mountains of the extreme south, the bulk of Africa was probably once part of the ancient continent of Gondwanaland, which included the Brazilian plateau, Africa, Arabia, the Deccan, and the western plateau of Australia. These are blocks of relatively ancient and unfolded rocks separated either through the subsidence of those parts of the former continent that are now covered by the Atlantic and Indian Oceans, or as a result of 'continental drift.'

DRAINAGE

The river-system and lake-basins of Africa present many interesting features. Some important rivers run in a direction that carries them away from the nearest coast, notably the Niger, the Zambezi, and the Orange. The Niger, the Orange, and the Congo also show a notable constriction of their basins round their lower courses. Most of the shorter rivers take much more direct routes to the sea—*e.g.*, the Senegal, the Volta, the Ogowe, and the numerous rivers of the east coast—a fact no doubt associated with the largely peripheral rainfall of the continent. But no African river of importance exhibits a reasonably evenly graded course, although the middle courses of the Niger, Congo, and Nile are of remarkably slight gradient. Relatively near to its mouth each of the great rivers exhibits an impediment to navigation in the shape of rapids and falls, and these are part of the chief evidence of comparatively recent interference with the earlier drainage-lines of the continent. That is to say, the rivers flow for much of their courses over the plateau-surface, and sooner or later each falls over the edge to a track at a lower level.

The existence of a high rim to the continent results in general in a heavier rainfall on the seaward side, and the relatively short and steeply graded peripheral rivers are very

AFRICA

actively cutting back into the plateau, in consequence of which they are busy capturing drainage previously flowing from the rim toward the interior. A careful study of a good physical map of the continent will illustrate the process of river-capture in its various stages. Heavy rainfall on the seaward side of the rim of the continent leads to the development of short, active rivers that rapidly eat into the plateau; many examples may be seen along the Guinea coast—*e.g.*, in Sierra Leone and Liberia—and along the eastern coast, as in Natal. Next a coastal river secures a footing on the inside of the rim, as exemplified in the Limpopo. At a still later stage, an active river, having cut through the rim, captures some of the drainage flowing toward the interior. Thus the Upper Senegal and the upper section of the Black Volta, both of which formerly ran to the Niger, have been diverted as a result of such capture. A further excellent example is seen in the upper Kunene, which formerly ran into the Etosha Pan and now flows to the west coast just north of Cape Frio. The next stage is the capture of a main river by a specially active coast stream. Fundamental changes in drainage follow, and the present courses of some of the great rivers of Africa are the result of such diversions. In the case of the Niger the rim of granite that runs parallel to the Guinea coast is relatively narrow at Bussa, where the falls occur at which Mungo Park lost his life. It would appear that an active coastal river ate through the rim at this point, and, rapidly excavating its bed in younger and softer rocks to the north, carried away to the Gulf the Niger drainage that formerly ran northward. 'Rapids (the Kebrabasa Falls) occur on the Lower Zambezi just above Tété, showing where a coastal river entered the plateau and, with the assistance of a heavy rainfall, first cut back to capture the Loangwa and then worked back to the basalt ledge marked by the Victoria Falls. Just above this point it was able to capture the water of several rivers that formerly ran to Lake Ngami and the Makarikari Salt-pans.

The process of capture is still rapidly going on. The coastal rivers of West Africa are every year capturing more

GENERAL PHYSICAL GEOGRAPHY

and more of the Niger water. They have already seriously diminished the quantity of water going toward the Sudan, so that even within the last century the floods of the Timbuktú region have very considerably lessened. The Ubangi and, especially, the Benue are making serious inroads upon the water that goes into Lake Chad. The Ogowe (Gabon) is making a bid for some of the Middle Congo water. The Zambezi, which has already diverted much drainage from Lake Ngami, is now busy capturing the bulk of the rest by means of its Chobe tributary, which joins it on the right bank some way above the Victoria Falls. Livingstone described Lake Ngami as a vast sheet of water, which it certainly is not now; and the Makarikari lake is believed to have dried up about 1820, leaving hippopotami, crocodiles, and fish stranded. Even as late as the middle of the nineteenth century the Chobe occasionally flowed toward Lake Ngami, and when the Victoria Falls were a few feet higher this region was doubtless a vast lake. Similarly, numerous rivers in the south-east corner are filching water from the Orange and Vaal.

The effect of all this has been to diminish the amount of water flowing to the relatively dry interior of the continent, and, further, by reducing the size of the interior sheets of water, notably in the Lake Chad and Ngami basins, to lower the humidity and rainfall of the interior, so that desiccation, apparent in historic times, is likely to increase and the extent of the dry lands of Africa become greater. Before its capture the Niger watered much of the Western Sahara; a greater Lake Chad permitted a much greater rainfall on the interior highlands of the Sahara; the draining of the Congo lake has had a share in the general desiccation; and the rapid drying-up of the Kalahari depression is to-day having considerable effects, so that even in years of 'normal' rainfall much of South Africa is desiccated by hot, dry winds from the Kalahari.

The rivers of Africa generally present three important features that have had great influence on the opening-up of the continent and the development of its economic life.

(a) The occurrence of falls and rapids, often covering

AFRICA

considerable stretches of the river-bed, is very noteworthy in the four great rivers, Nile, Congo, Niger, and Zambezi. These are associated with the structure and river development of the continent, and have hindered interior penetration and development.

(b) The *régime* of the rivers is determined by the rainfall, which, being seasonal in character over the greater part of

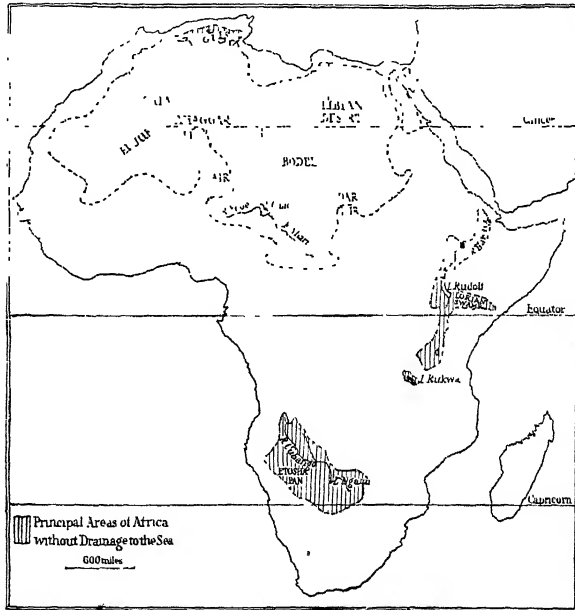


FIG. 7. THE CHIEF AREAS WITHOUT DRAINAGE TO THE SEA
In addition to the areas of principal drainage, there are large tracts, as in the Eastern Horn of Africa, with no surface water.

Africa, leads to big differences between high and low water, and thus affects both navigability and opportunities for agriculture. The Nile and the Niger are good examples.

(c) The great African rivers usually have deltaic mouths, mainly due to the absence of the strong tidal effects which are common where the continental shelf is well developed. The strong current of the Congo has hindered the development of a typical delta at its mouth, but the Niger, Nile, and

GENERAL PHYSICAL GEOGRAPHY

Zambezi provide striking examples. These deltas are normally unhealthy, and in tropical Africa are usually associated with mangrove-swamps.

Fully a third of Africa has no drainage to the sea, and its rivers are not comparable as lines of communication with the great waterways of Europe, Asia, North America, and South America. The *Nile* is the longest African river, with a course of some 3500 miles if the Kagera of Lake Victoria



FIG. 8. JUNCTION OF THE BLUE AND WHITE NILES

The Blue Nile bridge carries the railway at Khartum.

Sudan Government

be included. The sudd of the Bahr el Jebel section, the six cataracts of the middle course, and the periodical low water in the lower course are all hindrances to navigation; nevertheless, there is a good deal of local sectional traffic, by canoe in the Sudan and by small sailing-craft in Egypt, while Government steamers are met with as far up as Juba, in the Southern Sudan.

The *Niger* (2600 miles long) is mainly useful in summer, when the rainy season occurs. At this season it carries a good deal of traffic in the Sudan between Kulikoro and Kabara, the port of Timbuktu, and in Nigèria between Jebba and the delta, the intervening section being obstructed by a number of rapids. Its tributary, the Benue, is very useful

AFRICA

at the same time of the year, being navigable up to Yola, but in the dry season it has very little water, and can be used only by the smallest craft.

The *Congo* (nearly 3000 miles long) and its many long tributaries provide nearly 11,000 miles of navigable waterways in Central Africa above Leopoldville. The main stream does not vary in volume so much as the other great African rivers, and there is no obstruction for a thousand miles below the Stanley Falls, while it is navigable in several sections above this point. The occurrence of the Livingstone Falls has been a most serious hindrance to the development of this part of the continent, as the railway round them to the port of Matadi involves a break of bulk.

The *Zambezi* (1300 miles long) again has only sectional value. The Victoria Falls and the Kebrabasa Falls are serious obstacles, and the lower course is liable to disastrous floods in summer, and has little depth in winter. Since railways have been established here the port of Chinde on the delta has ceased to be important.

Of the remaining rivers of Africa the *Senegal* and the *Gambia* are perhaps the most important from the point of view of navigability; they are useful during summer floods. There is local value, too, in the same season in the lower courses of many of the smaller rivers, such as the *Volta*, *Limpopo*, and *Rufiji*, while the *Yobe* and *Shari*, draining to Lake Chad, are also useful. The *Orange*, about 1000 miles long, is all but useless.

It might be thought that the numerous falls that mark the rivers would provide many opportunities for the development of water-power. Actually development of this sort is unimportant. The *régime* of the rivers militates against it, and the places where such schemes might be operated are usually far from important centres of population. The river *régime* and the structure of the continent also hinder large irrigation schemes. The Nile provides the only examples of big irrigation development; there are important possibilities from this point of view, however, along the Middle Niger.

GENERAL PHYSICAL GEOGRAPHY

LAKES

The lake-basins of Africa are broadly of two types. In the first group may be included those with low, flat shores, which are usually areas of internal drainage, such as the shotts of the Atlas region, Lake Chad, Lake Ngami, and the salt-pans or 'vleis' (as they are called in South Africa) which are numerous in shallow hollows of the arid south, as well as larger areas of brackish swamp such as the Makarikari Salt-pans and the Etosha swamp. These vary in size from season to season and from year to year. Other areas of lake and swamp, drained, however, by rivers, include Lake Debo and other lakes lying west and south-west of Timbuktu, Lake No at the junction of the Bahr el Ghazal with the Nile, and various lakes—for example, Lake Leopold II—in the Middle Congo basin. An important lake of this group is Victoria Nyanza, occupying a broad depression in the Lake Plateau, and to the north is the lake and swamp area known as Lake Kioga; both of these are drained by the Nile. Lakes Bangweolo and Mweru, discharging to the Congo, are of the same type. The other great lakes of the continent belong to a second type, and differ from those of the first both in origin and character. They are confined to the Great Rift Valley, and are marked by great length and depth and by their steep, cliff-like confining walls. Some—notably Lakes Rudolf and Stephanie—have no outlet to the sea. The water of the remaining lakes is (apart from some small ones of inland drainage) shared by the Nile, the Congo, and the Zambezi. The student should carefully study the somewhat complex drainage of the Rift Valley. Water from Lake Tanganyika escapes by the Lukuga only in very wet seasons, while the drainage of Lake Nyasa along the Shiré is also very variable. The variations in level of these lakes seem to be due primarily to differences in the annual rainfall, for these vast surfaces of water suffer from intense evaporation.

CLIMATE

A major influence upon the climate of Africa is the high altitude of the sun over the greater part of the continent.

AFRICA

The vertical sun is experienced over some three-quarters of the area, and its effect is heightened by the aridity of much of the interior. Moreover, no part of the continent is sufficiently far from the equator to experience a very low altitude of the sun even in winter,¹ so that low temperatures, where they are felt, are largely the result of altitude rather

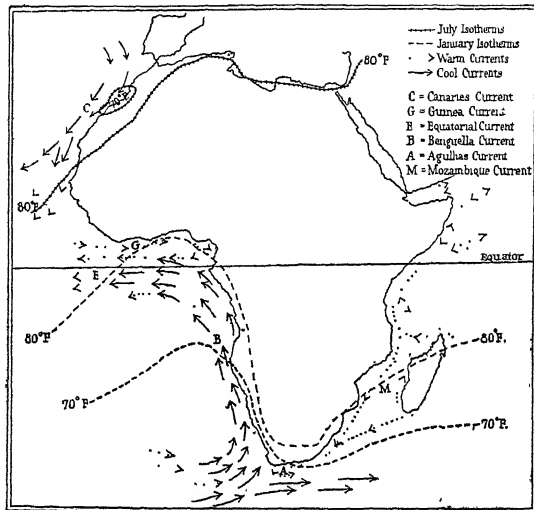


FIG. 9. OCEAN CURRENTS AFFECTING THE CLIMATE OF AFRICA

The effect of the cool currents upon the course of the isotherms shown should be noted. The reversal of currents in the Indian Ocean is due to the change of monsoons

than latitude, or occur only at night in desert regions where radiation is intense. The greater width of Northern Africa, its lower altitude, and its proximity to Asia all help to provide some climatic contrasts with Southern Africa (although there are also some striking similarities). Other influences that play their part are monsoon effects, ocean currents, and the nearness of the plateau rim to the coast.

The currents of the seas surrounding Africa exercise considerable control over both temperature and rainfall. Flow-

¹ The lowest noon altitude at the tropics is 47° ; at Cape Blanco it is 30° and at Cape Agulhas 32° .

GENERAL PHYSICAL GEOGRAPHY

ing southward along the west coast of North Africa is the Canaries Current, a narrow strip of cool water, the relatively low temperature of which is further decreased by the north-east trade-winds, blowing the surface-water away from the coast and thus causing an upwelling of cool water from lower levels of the sea. An area below 70° F. in this part of Africa in July, as shown in the isothermal map, is a clear indication of the effect of this current upon the coastal temperatures, the effect being necessarily more marked in summer than in winter. Fogs are common here as the result of the chilling of warmer air passing over the cool water, and the current also has the effect of reducing the precipitation along the coast by which it runs.

The counterpart of this cool current south of the equator is the Benguella Current flowing northward along the west coast of South Africa, where the significant name of Cape Frio is met with. Its effect is augmented by the upwelling of cold water due to the offshore south-east trades, and the coastal strip is foggy and arid. The cold influence is again more marked in summer, and the January isotherms of 70° F. and 80° F. bring out a striking contrast in temperature between the west and east coasts of South Africa. Nevertheless, the Benguella Current has a distinct effect upon temperatures at all seasons, for the surface temperature of its water off the south of South-West Africa does not rise above 57° F.—although, of course, the cooling is confined to a relatively narrow coastal strip.

Warm currents adjacent to a mainly tropical continent like Africa have their chief effects in reducing the annual range of temperature in the coastal districts by which they flow and in increasing the rainfall, for warm, moist air reaches the coast across them, and condensation tends therefore to be profuse. Flowing along the Guinea coast is the warm Guinea Current (over 80° F.), which promotes high temperature and heavy rainfall in the coastal regions of Upper Guinea. This current curves round in the Bight of Biafra and links up with the west-flowing water of the Equatorial Current, into which the cool water of the Benguella Current also merges. In the Indian Ocean the equatorial

AFRICA

belt of surface-water is very warm, and is deflected by the east coast of the continent. The direction of the current, however, varies with the monsoon in the region north of Zanzibar, and it is noteworthy that the prevailing south-west wind of summer results in an upwelling of cool water along the coast south of Cape Guardafui. Passing south through Mozambique Channel is a current of warm water which clings to the coast of South Africa as far west as Cape Agulhas before it merges into the westerly drift of the "Roaring Forties." The west and east sides of the Cape peninsula show a striking difference in the sea-temperature; the water is cool in Table Bay and warm in False Bay.

The main facts of temperature, pressure, and rainfall can best be studied from climatic maps and statistics, but it is desirable here to comment on the conditions prevailing in January and July, so that seasonal contrasts may be clearly brought out.

January Conditions. Sea-level temperatures vary from rather more than 50° F. along the northern coast of Africa to more than 90° F. in the central part of South Africa, where, despite considerable elevation, day temperatures are very high, although great radiation at night results in a large daily range of temperature in the more arid parts. The equatorial coasts of both West and East Africa are about 80° F., from which temperature they vary little throughout the year. Isotherms are approximately latitudinal over the northern part of the continent, but in the southern part they show a very different arrangement, which is due to the position of the vertical sun in relation to oceanic influences already referred to. Thus the January isotherm of 75° F. cuts the west coast about the equator and the east coast about 30° S. The pressure distribution is of the greatest importance in connexion with winds and rainfall. The Mediterranean Sea—whose water has retained a good deal of summer heat—is an area of relatively low pressure in comparison with Central Europe to the north and the Sahara to the south, so that it is an area in which cyclones either originate or into which they pass from the Atlantic. The chief precipitation arising from these depressions falls upon

GENERAL PHYSICAL GEOGRAPHY

the coasts and mountain ranges of North-west Africa, the highest parts, especially of the Western Atlas, receiving a good deal of snow. The islands off North-west Africa also receive their chief precipitation at this season. The eastern part of the north coast of Africa—lower both in latitude and altitude than the Atlas region—receives only a small rainfall, which is chiefly coastal, Alexandria's 8" of winter rain contrasting with Cairo's 1". Over the Sahara and Sudan the winds are northerly, from a relatively high pressure to the

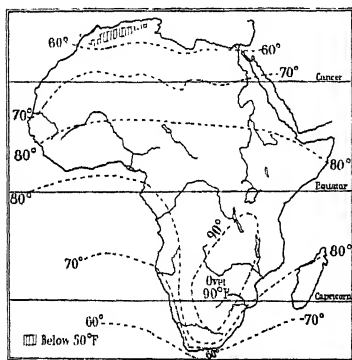


FIG. 10. JANUARY SEA-LEVEL ISOTHERMS

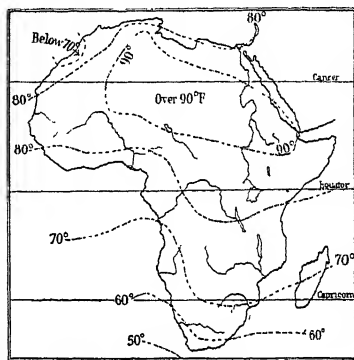


FIG. 11. JULY SEA-LEVEL ISOTHERMS

low pressure of the heat equator. This great belt is rainless at this season. The coast-lands of West Africa, washed by the Guinea Current, are influenced to some extent by south-west winds blowing less strongly than in the opposite season, and conditions here are little different as regards temperature from those prevailing in summer. The rainfall however, is less than in summer, and the dry harmattan wind from the Sahara reaches the coast intermittently, providing relief from the prevailing damp heat. There is a good deal of convectional rain along the equator except in East Africa, where the north-east monsoon is blowing parallel to the coast.

Low-pressure conditions obtain over the heated interior of South Africa, with a definite monsoon effect as a result.

AFRICA

There is heavy convectional rain over the southern part of the Congo basin, and the north-east monsoon and the south-east trades of the Indian Ocean are drawn in strongly, bringing heavy rains to Eastern and Central Madagascar and to the eastern part of South Africa, with a lesser amount to the interior. The amount on the mainland decreases westward and southward. Winds along the western side of South Africa blow roughly parallel to the coast, and this, together with the influence of the Benguella Current, accounts for the

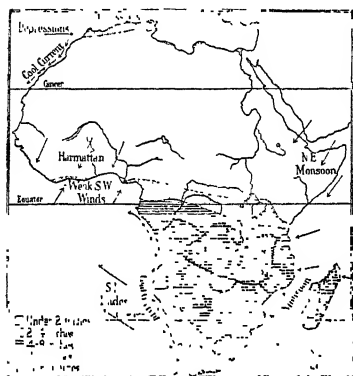


FIG. 12. JANUARY RAINFALL

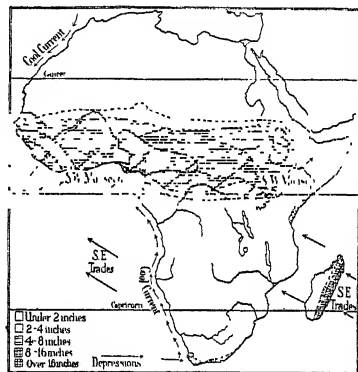


FIG. 13. JULY RAINFALL

small precipitation of this region. The south-west corner escapes the depressions of the "Roaring Forties," and is strongly influenced by the high-pressure area to the north of that belt, so that this area too is dry at this season.

July Conditions. The great width of Northern Africa and the absence of oceanic influence to the east of it results in excessively high temperatures over the interior of this part of the continent when the sun is vertical north of the equator. Summer temperatures here are distinctly higher than summer temperatures over Southern Africa. In July only the extreme south of the continent has an average temperature below 60° F. The Benguella and Canaries Currents are actively influencing temperatures along their respective coasts, especially the latter, and even the Red Sea, warm

GENERAL PHYSICAL GEOGRAPHY

though its water is, effects a slight reduction of temperature as compared with the Sahara on the one hand and Arabia on the other. Both the Mediterranean coast and the equatorial and Guinea lands have a mean temperature of about 80° F., but between these is an enormous area, covering a large part of the Sahara and the Sudan, with a mean temperature of over 90° F. Insolation through the clear skies of the Sahara brings about maximum shade temperatures of over 120° F., and that the mean is only something over 90° F. is due to the contributory effect of night radiation, which, of course, is greatly facilitated by cloudless skies.

At this season the Mediterranean Sea is an area of relatively high pressure lying to the north of the belt of low pressure that now exists over the heated Sahara. Northerly winds therefore prevail over North Africa nearly as far south as the southern limit of the desert. Precipitation is negligible. But the Sahara belt of low pressure is really a westward extension of the Asiatic low pressure, for the pressure gradient slopes downward toward North-west India. Streaming toward this low-pressure area, southerly winds pass across Central Africa south of the Sahara, so that coastal and highland regions receive very heavy rainfall, which decreases toward the desert and to the east. The areas of specially heavy rain are the coastal regions from Gambia to the Gold Coast and the great bend in the Gulf of Guinea, especially the Cameroon mountains. The Abyssinian Highlands, which lie athwart the southerly winds, are also wet. The Sudan, in fact, is having its wet season with a monsoon condition, but there is a rapid decrease in the amount of rain from south to north; nevertheless, even the highlands of Tibesti and other upland areas in the Sahara receive a certain amount of moisture. The Somali peninsula has only a scanty precipitation, for the southerly winds blow parallel with the edge of the plateau.

South of the equator there is a good deal of trade-wind rainfall on the eastern side of Madagascar, while the east coast of the mainland receives some relief rainfall, which, of course, is far less than that received at the opposite season of the year. The relative weakness of the south-east trades at

AFRICA

this season is attributable to the high pressure prevailing over the South African plateau. The high eastern rim of the plateau cuts off the rain from the interior, and drought prevails over the greater part of the area. The extreme south-west and south, however, receive the benefit of the westerly winds and depressions of the Southern Ocean low-pressure belt, which have swung north with the vertical sun, and here is

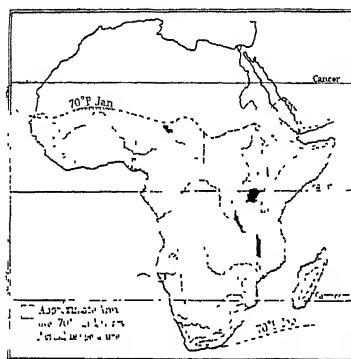


FIG. 14. APPROXIMATE AREA
OVER 70° F. IN JANUARY—
ACTUAL TEMPERATURE

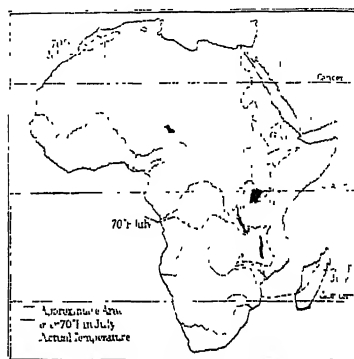


FIG. 15. APPROXIMATE AREA
OVER 70° F. IN JULY—
ACTUAL TEMPERATURE

the characteristic winter maximum rainfall of the Mediterranean type of climate.

The above general account may be supplemented by the following points :

(1) Maximum heat is experienced in the dry areas about the Tropics of Cancer and Capricorn when the vertical sun in summer shines through an atmosphere of low relative humidity and the summer day is longer than twelve hours.

(2) The high elevation of much of the continent leads to considerable modification of temperature. (See Figs. 14 and 15.)

(3) Ranges of temperature—both daily and annual—are related to distance from the sea, to elevation, to the distribution of rainfall, and to the *relative* humidity of the air. Annual ranges of temperature along the west coasts that lie near the equator are from 4° F. to 6° F., and even in interior

GENERAL PHYSICAL GEOGRAPHY

districts of these latitudes are only a few degrees more. In the Sahara they reach well over 30° F.—nearly 40° F. near the Atlas Mountains—and in the interior of Southern Africa over 25° F. The daily range, too, is excessive in the dry areas, and minimum temperatures in the Sahara go below



FIG. 16. LENGTH OF THE DRY SEASON

This map, based upon statistics in Kendrew's *The Climates of the Continent*, shows the number of months with a mean of less than one inch of rain. It is drawn for the 1931-32 season. Note the large area of the Sahel and the east coast of Madagascar.

freezing-point. All regions with a well-marked dry season have a considerable daily range of temperature. It should be remembered that, although humidity is a great controlling factor of both insolation and radiation, it is the *relative* humidity that counts, and although the Saharan air may actually contain more water-vapour than air over the British Isles—evidenced by frequent copious dews—the humidity in relation to temperature is uniformly low.

CLIMATIC FIGURES FOR TYPICAL PLACES IN AFRICA¹

PLACE	LAT.	ALT. (feet)	—	J.	F.	M.	A.	MY.	JN.	JY.	AUG.	S.	O.	N	D.	ANNUAL RANGE (in ° F.)	ANNUAL RAINFALL (inches)
(1) Alexandria	32° N.	105	° F. In.	56 2.1	57 0.9	60 0.5	64 0.2	68.5 —	73.5 —	77 —	78 —	76.5 —	73 0.3	66.5 1.4	59.5 2.6	22 —	8
(2) Cairo	30° N.	98	° F. In.	52.5 0.4	55.5 0.2	61 0.2	67.5 0.1	74 —	79 —	81 —	80.5 —	76 —	72 0.1	64 0.1	56 0.2	28.5 —	1.3
(3) Algiers	37° N.	72	° F. In.	49.5 4.0	50.5 2.6	52.5 3.3	56 2.0	61 1.7	68 0.7	73.5 0.1	74.5 0.1	70.5 1.2	63.5 3.4	57 4.1	52 4.0	25 —	27.2
(4) Biskra	35° N.	410	° F. In.	52.5 0.5	56.5 0.7	61 0.8	68 1.2	76.5 0.6	85.5 0.4	92.5 0.2	90.5 0.1	84.5 0.6	72.5 0.8	61 0.4	53 0.6	40 —	6.9
(5) Khartum	16° N.	1280	° F. In.	70.5 —	73.5 —	79 —	86 —	90.5 0.1	91.5 0.3	88.5 1.6	86.5 2.2	88 0.7	87.5 0.2	80 —	72 —	21 —	5.1
(6) Mongalla	5° N.	1440	° F. In.	80.5 0.1	81.5 0.7	82.5 1.5	81 4.2	79 5.4	77.5 4.6	76 5.2	75.5 5.8	77 4.9	78 4.3	79 1.8	79 0.3	7 —	38.8
(7) Lagos	7° N.	25	° F. In.	81 1.1	82 2.1	83.5 3.7	82.5 5.7	82 10.5	79.5 18.7	78 10.7	77.5 2.8	78.5 5.3	79.5 7.8	81.5 2.6	81.5 0.8	6 —	71.8
(8) Entebbe	Eq.	3863	° F. In.	71 2.6	71 3.6	71.5 5.8	70.5 9.8	70 8.5	69.5 5.1	68.5 3.0	68.5 3.0	69.5 3.1	70 3.5	70 4.9	70 5.1	2.5 —	58.0
(9) Bolobo	2° S.	1083	° F. In.	78 5.0	78.5 7.0	79 4.6	78.5 7.2	78 5.6	78 0.4	77.5 —	78 2.7	78 3.8	77 6.5	76.8 9.6	77 10.2	2.2 —	62.6
(10) Dar es Salaam	7° S.	43	° F. In.	81.5 3.7	81.5 2.1	80.5 5.2	78 12.3	76.5 8.1	74.5 1.1	73.4 1.6	73.5 1.1	74.5 1.3	76.5 1.3	79 3.1	81 4.4	8.1 —	45.3

(11) Tabora .	• 5° S.	3983	° F. In.	71 5·7	72 5·2	70·5 6·7	71·5 5·2	71 0·8	70·5 0·2	71·5 —	73 —	76·5 0·3	77·5 0·5	76 3·2	70·5 5·7	7 —	— 33·5
(12) Mozambique .	• 15° S.	13	° F. In.	82 7·9	81·5 8·7	83 7·4	81 4·4	77·5 2·3	74 1·0	73·8 0·5	74·5 1·3	77 0·5	80 0·1	83 0·3	83·5 4·9	9·7 —	— 39·3
(13) Salisbury	• 18° S.	4886	° F. In.	69·7 7·5	69 7·4	68 4·5	65·5 1·0	60·5 0·5	57 0·1	56 —	60 0·1	66·5 0·3	70·5 1·1	70·7 3·7	69·6 5·8	14·7 —	— 32·0
(14) Durban	• 30° S.	260	° F. In.	76·5 4·6	77 5·3	75 6·0	72 3·6	68 2·6	65 1·8	64·5 1·7	66 1·8	67·5 2·7	69·5 5·1	72 4·7	74·5 5·2	12·5 —	— 45·1
(15) Pretoria	• 26° S.	4471	° F. In.	71·5 5·4	71 4·2	68 3·6	56·5 1·2	52·5 0·6	51·5 0·3	56·5 0·5	56·5 0·5	63·5 0·6	67·5 2·5	69 4·7	71 4·4	20 —	— 28·1
(16) Swakopmund	22° S.	20	° F. In.	62·5 —	63 0·1	63·5 0·2	60·5 —	58·5 —	56·5 —	55 —	55 —	56 —	58 0·1	58·5 —	61·5 0·2	8·5 —	— 0·6
(17) Port Elizabeth	34° S.	176	° F. In.	70 1·2	69·8 1·3	69 1·9	65·5 1·9	62 2·4	59 1·7	58·5 1·9	59·5 2·1	59·5 2·4	62 2·3	65 2·0	67·5 1·7	11·5 —	— 22·8
(18) Cape Town	• 34° S.	40	° F. In.	69·5 0·7	70 0·6	68 0·9	63 1·9	59 3·7	55·5 4·4	54·5 3·6	55·5 3·3	58 2·3	60 1·6	64·5 1·1	68 0·8	15·5 —	— 24·9

Notes. (1) Fair annual range. Small winter rain—margin of Mediterranean rainfall. (2) Large annual range—nearly 30° F. Desert conditions slightly modified by humidity from Nile delta. (3) Characteristic figures for the Mediterranean type of climate. (4) Desert conditions of Northern Sahara. Note large annual range. Small rainfall. (5) Conditions of the Southern Sahara or northern fringe of the Sudan belt of summer rain. Contrast annual range with that of (4). (6) Southern Sudan. Small annual range; summer rain modifies summer heat. Definite dry season (winter), with negligible rain. (7) West African coastal conditions. Relatively small rainfall in winter. Note that Freetown has 157 in. of rain and Cape Coast Castle only 35·1 in. (8) Temperatures modified by altitude; insignificant annual range. Rain all the year, with two maxima. (9) Just south of the equator—the Congo basin. Insignificant annual range of temperature and short dry period in winter. Two rain maxima. (10) Tropical coast of East Africa. Maximum rain in summer, but two maxima. Note the following rainfalls going northward—Mombasa, 46 in., Kisumu, 14·5 in., Berber, 2·4 in. (11) Tropical East Africa plateau. Temperatures modified by altitude. Definite drought in winter. Two rainfall maxima still shown. (12) Monsoon coast of East Africa opposite Madagascar, but small rainfall in winter. (13) The Rhodesian savanna. Contrast temperatures and rainfall with those of Khartum, about the same distance north of the equator. (14) Note small annual range and monsoon character of rainfall, although no very definite drought. (15) The veld. Moderate rainfall, chiefly summer. (16) Desert coast of South-West Africa. Low temperature for the latitude, due to Benguela Current. (17) South-east coast of South Africa. Sub-tropical temperatures, with rainfall at minimum in summer. Two rainfall maxima, in spring and autumn. (18) Mediterranean type of rainfall, although no month entirely without rain. Contrast temperatures with those of Algiers.

¹ Except for some figures for the Union of South Africa (taken from the *Year-book of the Union of South Africa*), the details in this table are based upon those given in Kendrew's *The Climates of the Continents*.
Temperature figures are usually given to the nearest half degree and rainfall figures to the nearest tenth of an inch.

AFRICA

(4) Over the greater part of Africa rain follows the vertical sun—that is, the maximum rainfall occurs in the summer months. If the two regions of Mediterranean climate and

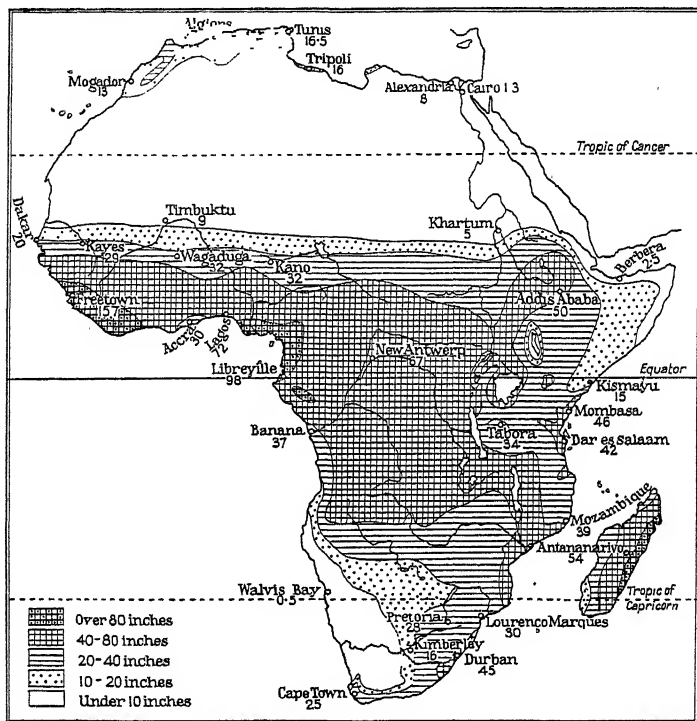


FIG. 17. MEAN ANNUAL RAINFALL

The rainfall of a number of representative places is shown on the map.

the purely arid areas be excluded, the rest of Africa experiences either a hot season with rain and a cooler dry season, or, if there is rain at all seasons, then a maximum when the sun is overhead in the hemisphere in which the region is situated.

(5) Places situated on or near the equator usually have during the year two monthly maxima of both temperature

GENERAL PHYSICAL GEOGRAPHY

and rainfall. These maxima are associated with the passage of the vertical sun, and there is usually a distinct 'lag' in their incidence, as they do not normally occur in the month in which the sun is vertical. Thus at Libreville, almost on the equator, there are two maxima of rainfall—in March (with an April rainfall only very slightly less) and October.

(6) Two characteristics of the rainfall are important—(a) its variability, especially well marked where it is seasonal in character, so that the mean figures mask very great differences from year to year, (b) its generally convectional character, so that the long-continued, relatively gentle rain of the British climate is uncommon. Convectional rain is, of course, an important factor in soil erosion.

(7) The aridity of the Sahara arises primarily from the fact that the pressure gradient slopes southward throughout the year, leading to winds chiefly from a northerly point. In consequence there is little penetration of oceanic influences. In the Kalahari Desert and South-West Africa lack of oceanic influence is again responsible. Moist air from the Atlantic that has crossed the cool Benguela Current is warmed, not cooled, in contact with the land, and so deposits no moisture. Winds from the east have crossed a wide stretch of high land, and are off-shore and practically dry. These dry lands belong to the so-called trade wind deserts of the world.

VEGETATION

The distribution of forest, grass-land, and desert follows very closely the rainfall conditions. Broadly speaking, the wetter areas are forested, the arid areas are semi-desert or desert, and the areas of winter drought are grass-land.

Mediterranean woodlands of evergreen trees and shrubs are adapted to a hot, dry season and a mild, wet season. In North-west Africa the hilly belts are well covered with forests of evergreen oak (including the cork-oak) and cedar, while evergreen shrubs with hard and usually small leaves are common, as growth is slow, but continuous almost throughout the year. The olive is probably indigenous. This area is regionally continuous with Southern Europe. Typical cultivation includes wheat (a winter crop unless

AFRICA

irrigation remedies summer drought), the vine, and, with irrigation, the orange. The vegetation of the south-west corner of Africa is similar, but conifers are rare. Fruit, so far as it is a large-scale cultivation, is a relatively modern introduction. The dry pastures are suited to sheep and goats, but the conditions do not favour dairy cattle.

Temperate forest is rather poorly represented in Africa for obvious reasons, but is met with on the lower slopes of the Abyssinian Highlands (where, however, the deep valleys are more tropical in type), and elsewhere within the tropics on a few areas of highland of considerable elevation and rainfall.

Equatorial rain forest, with a heavy canopy of foliage overshadowing below a gloomy vault characterized by lianas and epiphytes, exists in the regions where high temperatures are combined with plentiful precipitation and no definite period of drought. It extends in an irregular belt from the Gambia mouth through the Congo basin, and is almost broken in the middle of the Upper Guinea coast through insufficient rainfall. Its absence round the Lower Congo, due to decreasing rainfall and increasing altitude, is also noteworthy. This type of vegetation occurs again along the east coast of Madagascar and of tropical East Africa, where, although the rainfall is more definitely monsoonal, the general conditions of continuous heat and moisture are similar. *Mangrove swamps* characterize inter-tidal flats of the coastlands within the tropics.

An outlying area with some features similar to those of this type of forest also occurs along the coast of Natal, where, although palms of a tropical character occur, the vegetation is by no means so luxuriant as farther north.

The forests of West and Central Africa contain some valuable timber-trees, such as mahogany, as well as the oil-palm and varieties of rubber. The oil-palm is not found east of the western branch of the Great Rift Valley. As a food the banana is widely cultivated, and tropical plants—*e.g.*, cocoa—have been introduced with success. The conditions do not favour cereal cultivation, except perhaps rice, but roots like cassava are widely grown. Pastoral occupations are necessarily poorly developed.

GENERAL PHYSICAL GEOGRAPHY

The *African savannas*, or tropical grass-lands, cover a very large area surrounding the central jungle, but the actual vegetation cover is by no means uniform over the vast area indicated on the map. Although insolation is considerable throughout the year, and the cooler season is generally dry,

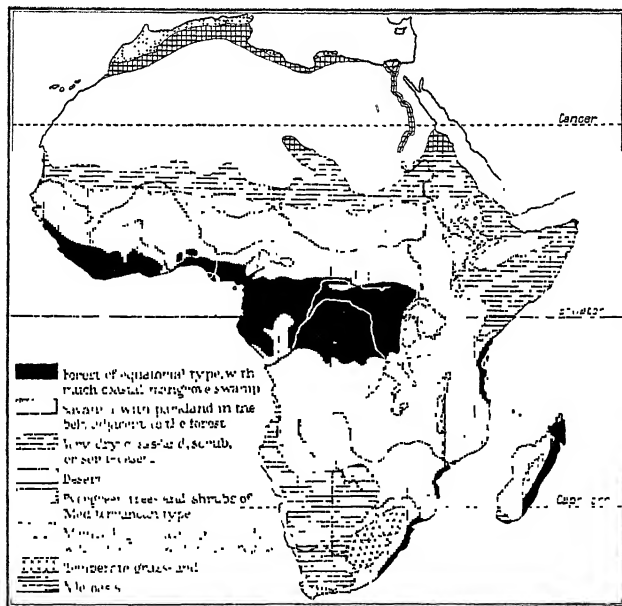


FIG. 18. NATURAL VEGETATION—GENERALIZED

the elevation and total rainfall are varying factors. On the edge of the Sahara the semi-desert is a thorny scrub, which passes southward into the park-land, where tall grasses are interspersed with trees. The trees, except by streams or in moist hollows, are usually isolated. The huge baobab or monkey-bread tree illustrates storage of water, while "umbrella" trees show adaptation to drying winds. Nevertheless, tall grass, usually in tufts, is the prevailing cover, though patches of bare ground and evergreen prickly bushes are common. Dwarf acacias producing gum are a feature

AFRICA

of the drier Sudan. The savanna extends over the Lake Plateau across the Zambezi to the Drakensbergen, and dies out toward the Kalahari in the thorny scrub of the bushveld.

Millet and maize are the most typical grains of the savanna lands, but the cereals of the cooler temperate zone are grown as winter crops. Ground-nuts are a product of great importance, and cotton has long been cultivated. There are, of



FIG. 19. CATTLE ON FARM NEAR GWELO, SOUTHERN RHODESIA

A herd of cattle in typical savanna country,
High Commissioner for Southern Rhodesia

course, wide differences in productivity over the enormous area of the savannas, which are nearly everywhere important for pastoral occupations.

The *temperate grass-land*, or *veld*, is steppe in character except in regard to its winter climate, which differentiates it from the temperate grass-lands of North America and Eurasia. Short grass and low plants adapted to a brief growing season are characteristic, but there are considerable differences due to altitude. It is by no means everywhere adapted to cultivation, but maize, temperate cereals, and tobacco are grown. In more favoured districts or with irrigation fruit is produced, the hot summer favouring the

GENERAL PHYSICAL GEOGRAPHY

vine and citrus fruits. Pastoral occupations largely characterize it.

High-plateau grass-land is a feature of a number of areas within the tropics, such as the Abyssinian and Adamawa Highlands and the plateau of Madagascar. Relatively temperate in character, the conditions favour pastoral occupations.

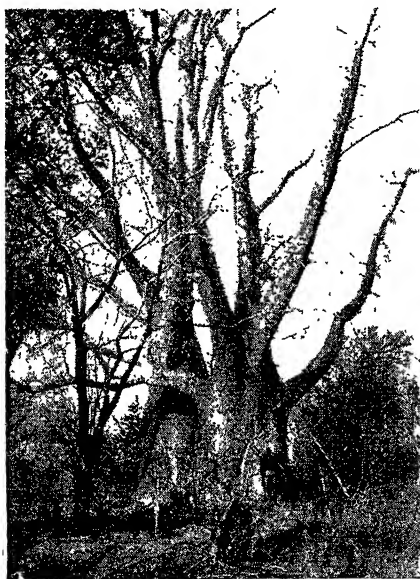


FIG. 20. BAOBAB, SUDAN

A tree important in the economy of the African in the savanna zone.

Union Castle Line

Semi-desert and *desert* cover a very large part of the continent. In the semi-desert or scrub-land there is no continuous cover, and drought-resisting plants, either fleshy or prickly, are the usual type met with. North of the equator they are often aromatic. The south-west corner of Madagascar is of this scrub character, being deficient in rainfall, and within the Sahara the highland areas have a similar cover. The Plateau of the Shotts is another region of the same type. The extent of true desert in South Africa is

AFRICA

far smaller, of course, than north of the equator. There is both stony and sandy desert in the Sahara, and scattered growth occurs where underground water is not far below the surface. Oases permit of isolated settlements—often very large—where cultivation is carried on, the characteristic products being dates and wheat. The strip of intensive cultivation along the Nile may properly be regarded as an elongated oasis.

ANIMAL LIFE

This brief survey of the vegetation of Africa may be supplemented by a short description of the animal life. The tropical forests are enormously rich in insect and bird life, but large animals are chiefly confined to the rivers and swamps or to the borders of the forests. The occurrence of representatives of the higher apes is a feature of some interest. Animal life in the savanna is rich and varied. The more open conditions have promoted the development of swift-moving types, like the giraffe, zebra, antelope, and ostrich, preyed upon by large carnivores. Here and in the remaining areas (except the desert) domestic animals are important, although the tsetse fly seriously interferes with the rearing of cattle and horses in many parts within the tropics. In North-west Africa and South Africa there are many areas particularly well suited to the rearing of sheep and goats. The introduction of firearms and the opening-up of Africa have led to a rapid decrease in the numbers of the larger animals. In many parts stringent game-laws have been passed.

So important is the effect on the economic life of Africa of certain insects that they may be specially considered here. The mosquito and the tsetse fly have been called the most important animals of Africa. The anopheles mosquito acts as host to the germ of malaria, and in almost the whole of Africa protection against mosquito bites is necessary, and is combined with regular dosing with quinine as a precaution. Mosquitos breed in stagnant water, haunt dark places, are active at night, and are prevalent during the rainy season, usually summer. Malaria is not usually fatal when treated

GENERAL PHYSICAL GEOGRAPHY

properly, but is debilitating and difficult to get rid of. It is noticeable that several negro races of fine physique, like the Zulu, inhabit regions that are largely free from malaria. Mosquitos are also carriers of other diseases, notably yellow fever.

The tsetse fly acts as host for the trypanosome of sleeping sickness, and the infected fly is found in many areas within tropical Africa, although seldom above 4000 feet. There is more than one form of the disease, and more than one species



FIG. 21. HERD OF ELEPHANT

Severe restrictions are now imposed in most African territories upon the killing of elephant, as of other big game. Note the park-land type of country.

Sudan Government

of the fly carries it. Sleeping sickness has been a great scourge, especially in Uganda, but preventive measures have limited it in recent years. The bite of the infected fly induces *nagana* in domestic animals and game, and it is noteworthy that when rinderpest decimated the animal life of South Africa in 1892 and subsequent years sleeping sickness disappeared from the areas which were then cleared of game.

Micro-organisms and ticks are responsible for many diseases of domestic animals, but where European influence is felt these are now being brought under control. Scab in sheep and goats can be prevented by dipping, rinderpest in cattle by inoculation. East-coast fever and gall-sickness, both terrible scourges to cattle, are avoided by the regular use of the dipping-tank. The dipping-tank is regarded as

AFRICA

the salvation of the breeder of cattle; there are some 14,000 dipping-tanks in the Union of South Africa alone.

The locust, whose ravages vary from season to season, troubles the whole of Africa outside the central forested areas, and the termite, or white ant, which attacks timber and young trees, is a pest in the tropical belt.

The insect life of Africa undoubtedly provides a major problem in connexion with the development of the continent. The list of harmful insects is a considerable one, and even those of relatively minor importance, such as the chigoe flea (the 'jigger') and the 'maggot fly,' both of which deposit eggs under the skin, may be very troublesome, while the hookworm (an intestinal worm that develops from larvæ that attack the skin) is the cause of much chronic anæmia and debility. Nevertheless, the conquest of the mosquito and of the tsetse fly is fundamental, and much active work is being carried out in connexion with it. One of the chief difficulties is that there are different varieties of each requiring different methods of suppression, while it is unfortunate that the motor-car is a ready means of spreading the tsetse fly from an infected area to a free area.

An example of the control of malaria is provided by the copper-mines of Northern Rhodesia, where the native death-rate of 1931 was nearly halved the next year by measures taken against two dangerous species of anopheles mosquito. With regard to human trypanosomiasis, due to the tsetse fly, it is stated to be curable now by drugs if treated in the early stages, and progress has been made in the treatment of *nagana* by similar methods; the economic importance of this is considerable, as it is believed that the cattle population of Africa could easily be doubled if the danger of trypanosome infection could be removed. It is noteworthy that the ravages of the locust, which in recent years has scourged much of the Sudan and East Africa, has led to co-operation between British, French, and Italian authorities for the control of this pest.

CHAPTER II

POPULATION AND ECONOMIC REGIONS

THE native peoples of Africa vary in racial origin, and stand at many different cultural levels. Northern Africa has had an age-long relationship with the outside world; Arab influence along the east coast goes back to a period antecedent to those voyages of discovery that brought West and South Africa within the ambit of European interest. Gradually the penetration and exploitation of the continent by Europeans culminated in the partition of Africa in the last quarter of the nineteenth century. This has led to important social and political problems, for new ideas and economic forces have subjected the native social structure to severe strain, involved in which is the relationship between European and African in the future development of the continent.

PEOPLES

From the ethnic point of view there is both a white and a black Africa, but the first important human occupation appears to have been by negroes or negroid people, several types of whom probably entered the continent from Arabia and spread over the land south of the Sahara Desert. They probably inhabited the Sahara also, for in the glacial period it was well watered and fertile. Northern Africa, however, was penetrated by the invasion from Europe or Western Asia of Caucasian (white) peoples at a later date. These Caucasian peoples are broadly classed as Hamitic, and include an important type referred to as Berber, as well as the Tuareg. Semitic peoples at a later date penetrated Africa. They are the Arabs, who established themselves in Northern and East Africa. The Phœnicians who founded Carthage were Semites. Madagascar shows a remarkable

AFRICA

intrusion of Malayo-Polynesian people, who crossed the Indian Ocean, perhaps by way of island stepping-stones, probably more than two thousand years ago and settled on the island. which may or may not have had an earlier negro population. It may be noted that neither Greek nor Roman left any permanent ethnic mark upon Africa. The modern period has seen the settlement of large numbers of Europeans.

There has, of course, been much admixture of Hamite with Semite (Abyssinians, ancient Egyptians, etc.), of each with negro, and so forth. Negro Africa proper lies south of the Sahara, and it is usual to divide the negroes into two main types, the Sudan negroes and the Bantu negroes, the line of division being irregularly drawn from a point at the head of the Gulf of Guinea, round the north of the Congo basin, to the middle of Lake Victoria. The Sudan negroes speak a variety of languages, though showing relative uniformity of physical characteristics. The Bantu negroes, on the other hand, vary much in physical character, but speak allied languages, which are classified as Bantu. From the Bantu negroes must be distinguished the Hottentots and Bushmen of the south-west of the continent. The Bushmen are very small, yellowish-brown people, and formerly had a much greater extension, as their rock-drawings have been extensively found in Rhodesia. The Hottentots seem to occupy an intermediate position between Bushman and negro.

Varied cultural levels are found among the Africans. The Bushmen and the few pygmies of the interior of the Congo basin are at the hunting stage of development. The negroes are, broadly speaking, agricultural, though in the grasslands agricultural and pastoral occupations are combined. The Berbers of the north are mainly agriculturalists, but the Tuareg are nomadic. The Arabs are both settled and nomadic. But, except where Europeans have influenced Africa, the standard of agriculture is low. Flocks and herds are poor in quality and scourged by disease. Even in the north, where Carthage and Rome achieved remarkable productivity, agriculture is of a low standard. The negroes are generally wasteful cultivators, abandoning land as soon as

POPULATION AND ECONOMIC REGIONS

it has ceased to be productive, and little more than scratching the surface in place of ploughing, for the typical agricultural implement is the hoeing-stick.

The natives of Africa have in general little genius for political organization, and petty tribal divisions are the rule, though it is difficult to tell what might have happened to the expanding Fula empire in the Western Sudan and to



FIG. 22. IN ZANZIBAR TOWN

Zanzibar is the most important Arab-trading settlement in East Africa.

Union Castle Line

the Zulu empire in South Africa if European intrusion had not prevented their development. Large centres of population are generally absent, except where the Arab trading city or oasis town grew up. Indeed, until the modern period Africa had no towns in the proper sense of the word except where Arab influence had been at work—in the north near the Mediterranean, in the Northern Sudan, and in East Africa, where Arabs had established such trading centres as Mombasa and Zanzibar. Similarly, large-scale industry as understood in Europe is unknown to the African, except where it has been introduced and organized by the white

AFRICA

man, although many tribes exhibit considerable craft skill in metal, wood, and weaving.

Christianity once prevailed over Mediterranean Africa and much of the Nile valley, but, except in a debased form in Abyssinia, has been almost completely displaced by Mohammedanism, which is making rapid strides in the Sudan and part of East Africa. Elsewhere negro Africa is pagan except where Christian missions have influenced the people. Christian missionaries have, in fact, contributed much to the sum of knowledge of the geography of Africa, besides having led the way in the abolition of the slave-trade. In some instances they have been largely responsible for European intervention, notably in connexion with the protectorates of Uganda and Nyasaland.

EUROPEAN INFLUENCE

At the beginning of the Age of Discovery Northern Africa, including the Northern Sudan, and, through Arab traders, East Africa, had some contact with the outside world. The rest of the continent was self-sufficing, disunited, and at varying levels of primitive development. It could offer the European little that he valued, and its geographical conditions for the most part did not invite colonization. Portugal, the first European Power to establish itself in the newly discovered Africa, aimed at keeping the trade of the continent, mainly ivory and gold, in its own hands. The Arabs seriously interfered with Portuguese settlement in East Africa, but Angola was colonized at the beginning of the seventeenth century. The Portuguese did not establish themselves in South Africa, letting the Dutch in on the decline of their ascendancy. The Dutch made Table Bay their base in Africa. Dutch, British, French, and other Europeans all competed for a share in the trade of tropical Africa when Portuguese power declined. The nature of the trade is well illustrated by the names that still appear on the map of the West African coast—Grain Coast,¹ Ivory

¹ The 'grain' referred to was a spice grain—a seed which entered into commerce under the name of Malaqueta pepper.

POPULATION AND ECONOMIC REGIONS

Coast, Gold Coast, and Slave Coast. The settlements were coastal, and knowledge of the interior was extraordinarily vague. The slave-trade was for long most lucrative, and held the interest of many Europeans in Africa. Europeans carried it on in West Africa and Arabs in East and Central Africa. The plantations round the Gulf of Mexico and the Caribbean Sea, including the West Indies, were developed by slaves from West Africa, and the Portuguese decimated Angola for the development of Brazil.¹



FIG. 23. MANGANESE-MINING, INSUTA, GOLD COAST
Information Bureau of the Gold Coast Government

While South Africa was developing on its own lines, the interior of tropical Africa was neglected, a state of affairs which persisted far into the nineteenth century. Then the interested European Powers awoke to the value of tropical lands as sources of raw materials in growing demand in the modern world and also, if the demand could be created, as new markets for manufactured goods. The "scramble for Africa" began. Coastal trading-stations developed into spheres of influence which often became demarcated by straight lines in the absence of accurate topographical knowledge of the interior. Britain, France, and Belgium² secured large areas. Germany and Italy were late-comers in the

¹ The overseas trade in slaves ceased nominally early in the nineteenth century, but actually persisted for some years afterward.

² For a note on Belgian power see p. 216.

AFRICA

field of expansion in Africa. British interest partly resulted from activity in suppressing the slave-trade, while French interest in the Atlas region dates from France's rout of the Barbary corsairs in 1830. The German colonies were, after the Great War of 1914-18, allocated as mandates mainly to France and Britain, carrying the obligation to promote the material and cultural welfare of the indigenous peoples.

How far Africa provides a field for European settlement it is still difficult to say. Temperate South Africa, including the higher plateau areas, has certainly been effectively settled. Southern Europeans are established in North-west Africa. Elsewhere the highland regions offer the only possibility of permanent settlement. The great heat and strong insolation of tropical Africa are limiting factors, and where these are combined with high humidity there is a great debilitating effect upon the white man, as the skin cannot function properly. The prevalence of disease, too, cannot be overlooked, although this difficulty can, in a measure, be brought under control. On the highlands of Kenya, Tanganyika, and elsewhere it is perhaps best to regard white settlement as still being in the experimental stage, for average temperatures are but a poor guide to the climatic conditions of elevated regions. Broadly speaking, Europeans in tropical Africa must be only temporary inhabitants, whose work will be mainly of an official, supervisory, or commercial character.

Settlement from India has taken place to a small extent in parts of East Africa, and, but for political difficulties, might increase.

DENSITY OF POPULATION

The distribution of population in Africa reflects to a great extent the physical conditions. In particular, apart from the special case of the Nile valley, the density of population varies very largely with the rainfall. The Lower Nile valley is a region of increment where human intelligence has been applied in an arid region of high temperature watered by a river of extraordinary *régime*, with the result that it supports

POPULATION AND ECONOMIC REGIONS

a very dense population, strictly limited in area by the availability of the water. The Sahara Desert, apart from its oases and little-known highlands in the heart, provides no support for human life, and the influence of the water-supply is naturally well marked. The desert, moreover, is a broad

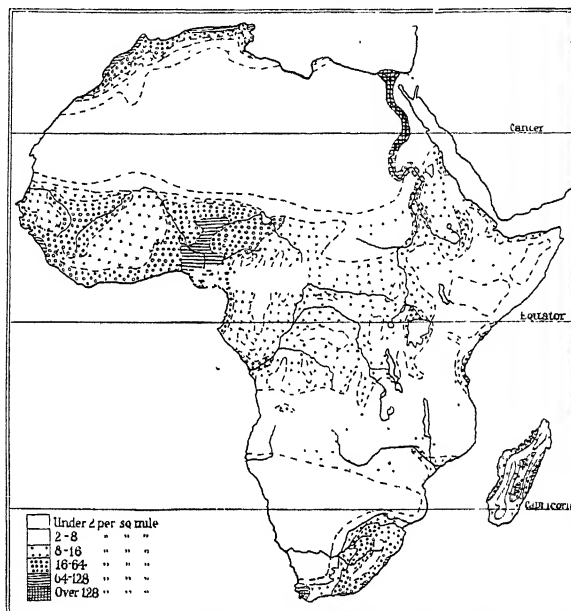


FIG. 24. DENSITY OF POPULATION

This map may usefully be studied in conjunction with the map of the mean annual rainfall. Along the Lower Nile the density considerably exceeds 1000 per square mile.

barrier to communication, and separates the relatively well-populated area of North-west Africa from the region of considerable density found in the tropical rain-belt. In North-west Africa coastal regions and valleys support the bulk of the population, and the greater proportion of very high land in Morocco is reflected in a thinner population, while, on the other hand, the plains of Tunis are particularly well peopled.

Over large areas of the Sudan and the savanna lands

AFRICA

generally pastoral pursuits largely predominate, and the density of population does not there reach that found where agriculture has more importance, as, for example, in the Niger basin and the region draining to Lake Chad. Deficient rainfall, as in the Eastern Horn, and extreme elevation, as in parts of Abyssinia and the mountains fringing the Lake Plateau, militate against population, but the Lake Plateau itself and the Rift Valley are well peopled. There rainfall and soil are favourable to agriculture and cattle-rearing. In Madagascar, again, the plateau has a greater population than the lowlands. Owing to the ease with which the simple necessities of life are obtained in tropical regions of heavy rainfall the population is relatively dense in such parts of Africa, but the influence of rivers as a means of communication and a source of food is well illustrated in the Congo basin, in West Africa, and by the Lower Zambezi. In South Africa large arid tracts are only thinly peopled, the comparatively dense population being chiefly found in the few regions of good rainfall or mining activity. The grass-land belt, being best suited to pastoral pursuits, supports only a light population.

The distribution of population in the continent will be found to have a distinct relationship with that of the major economic regions. The native population to-day is rapidly increasing in some parts, as a result of the European control, which has not only largely stopped tribal wars, but has almost completely stamped out the slave-trade, the methods of which were extraordinarily destructive of human life as well as of property. The slave-trade was largely connected with Arab and later with Portuguese penetration, but it may be remembered on the credit side of Arab influence that they introduced rice and sugar-cane and possibly other useful plants, while the Portuguese brought manioc, sweet potato, and maize.

The spread of Mohammedanism in many parts of negro Africa, another outcome of slave-trading which continues to-day, represents a great advance on the earlier beliefs and superstitions.

POPULATION AND ECONOMIC REGIONS

MODERN DEVELOPMENT

European influence has gradually brought the whole of Africa within the ambit of world-trade, but from the point of view of the division of the continent into economic regions there are two modern developments—not unrelated the one to the other—which are specially important. The partition



FIG. 25. DONKEY CARRYING LOAD OF HAY

The donkey is an important beast of burden in Mediterranean Africa and in the Sudanese zone.

Sudan Government

of Africa has left only Abyssinia (since her liberation in 1941), Egypt, and Liberia as independent political areas. Elsewhere, except in the Union of South Africa and Southern Rhodesia, where, as self-governing areas, there is direct control by the local white population, the power, both political and economic, of some European country is felt. This influence largely aims at the development of the area concerned as a commercial asset to the governing country. Tariffs and internal organization in such forms as research, agricultural education, and public health are directed toward this end, and the area tends to be delimited as an economic unit from adjacent regions under other control.

Arising from this political interest, but sufficiently important to need special emphasis, is the local improvement in

AFRICA

communications without which this development is impossible. The more primitive means of communication that so long prevailed in Africa, including sailing-craft on the Nile, canoes and human portage in Central Africa, camels in the desert, mules in the Atlas region, and the more recent ox-wagon of the south, could not suffice for modern needs, for the problem of opening-up Africa was largely the prob-



FIG. 26. CANOES ON LOWER TANA RIVER, KENYA

The canoe is a noteworthy means of transport in tropical Africa.

Union Castle Line

lem of overcoming the natural obstacles in the way of easy transport. This improvement in communications has taken the form of the making of roads, largely for motor-transport (though often with a surface unusable in the wet season), the provision of steamers on great rivers and lakes, and, above all, the construction of railways. Africa has now the skeleton of a railway-system, consisting mainly of unrelated local lines, the immediate object of which is either to connect a portion of the interior with the coast or to bring a section of navigable water into the general scheme of communication. The expense of railway-construction in relation to the volume of trade hinders extension, yet a single line may have difficulty in coping with a seasonal rush of trade. Sectional political interests tend to lead to independent railway development, thus assisting the demarcation of one region from another. The best-developed network of railways is

POPULATION AND ECONOMIC REGIONS

found in British South Africa, and the French are busily unifying the Atlas region, as well as their West African possessions, by means of railway extensions. Elsewhere railways are relatively disconnected, but so important is this aspect of modern exploitation that considerable improvements may be expected in the near future.

It will thus be seen that climatic conditions (especially as influencing the vegetation and the density and character of the population), together with the accident of ownership or control of an area by some European Power (giving a particular character to its administration and determining its development, the lay-out of its communications, and its channels of intercourse with the outside world), are the most important considerations determining the demarcation of an economic unit in Africa. Historical considerations, in so far as they illustrate a special type of civilization in any particular area, must also be taken into account.

ECONOMIC REGIONS

With the foregoing in mind it is possible to discuss the major economic regions of the continent.

(1) *North-west Africa and the Sahara.* The outlook and trade of the coast-lands have always been Mediterranean, and active French development in the Atlas region, and, to a lesser extent, Italian development in the Libyan area, have largely confirmed this in recent times. Climatically it is possible to subdivide this large area. The relatively well-watered coastal districts of the north-west are different from the Plateau of the Shotts and again from the desert. But, in avoiding subdivision, the justification for demarcating this region lies in its economic relationships. Certainly since Carthaginian times such trade as the Saharan oases carried on was mainly through Mediterranean ports, and in modern times French railways have already penetrated the desert in the north. French effort, directed mainly from the north, aims at bringing the scattered Saharan population into closer touch with the Mediterranean, while the somewhat limited economic possibilities

AFRICA

of the oases and scrub-lands are also to be borne in mind. The same is true of that part which was under Italian control. The southern boundary is marked by the increase in the

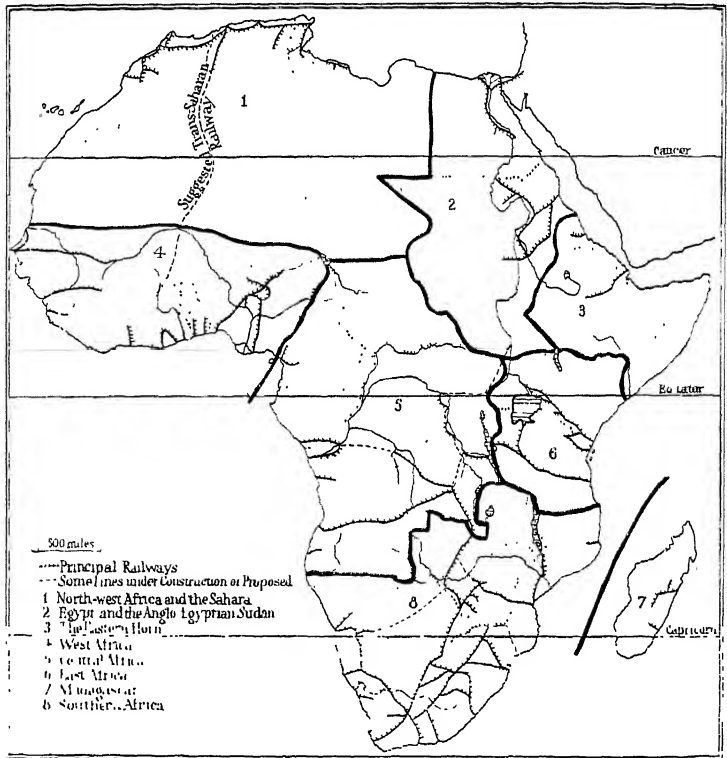


FIG. 27. MAJOR ECONOMIC REGIONS

Railway and political developments in tropical Africa south of the equator may make some modification of the regions desirable in the near future.

density of population reached in the savanna lands to the south; on the east a convenient political boundary is taken.

(2) *Egypt and the Anglo-Egyptian Sudan*. Here, apart from a certain unity given by the Nile, and in spite of the gradual change in climatic conditions going southward, there is one dominating crop—cotton, and primarily irrigation

POPULATION AND ECONOMIC REGIONS

cotton. It is true that there is divided political control, for the Anglo-Egyptian Sudan is a condominium dominated by the British partner, and that there is a break in the railway following the Nile valley; yet the Nile is to some extent a commercial link, and the exports of the Sudan from Port Sudan on the Red Sea reach their market mainly by way of the Suez Canal, which is within Egyptian territory.

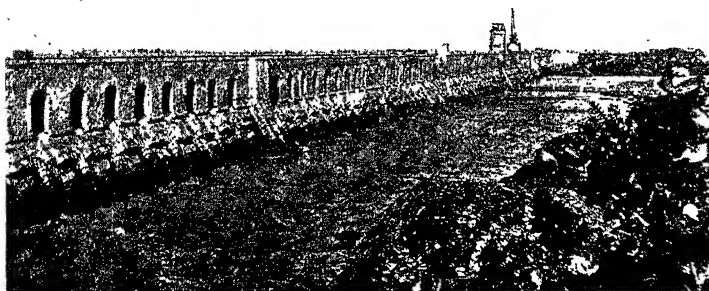


FIG. 28. THE SENNAR DAM

This dam was built on the Blue Nile to supply water for irrigation, and is typical of the type of dam built in the Sudan.

Sudan Government

(3) *The Eastern Horn.* From the point of view of external trade the whole of this area is of little economic importance. It contains a variety of regions, both as regards relief and climate. Abyssinia, with its monsoon rainfall, is relatively densely populated; the rest is arid and chiefly pastoral. Communications are ill-developed, and mainly trend eastward. There is a single narrow-gauge railway from Jibuti to Addis Ababa, which carries only a very slight traffic, and another short line running inland from Massawa. The whole region is one of the least-known areas of Africa, and is of small economic importance, while little immediate development seems likely. Political boundaries have been utilized to demarcate it, and the control of the region, with the restoration of her independence in 1941, is at present divided between Abyssinia, France, and Britain.

(4) *West Africa.* This area is clearly demarcated in the

AFRICA

north by the Sahara, on the west and south by the sea ; on the east a political boundary conveniently marks it off from a relatively undeveloped region. Included in it are both savanna and forest lands. Though partly drained by minor rivers, its dominant feature is the Niger basin. French and British interests have pursued a policy of active development, which throughout the region is dependent upon access



FIG. 29. RUBBER PLANTATION IN THE BRITISH-MANDATED CAMEROONS

Elder Dempster Ltd

to the Atlantic. In French and British administration West Africa provides an example of successful European control of coloured races, which here include some fine negro types, especially in the Sudan. The strips of French territory reaching the coast from the Sudan are a noteworthy feature, and help to account for the peculiar railway development. The French utilize the Niger and the railway from Bamako to Dakar to link the interior savanna districts with the west coast. The population, especially between Lake Chad and the Gold Coast, is very dense for Africa, but the total trade is at present hardly commensurate with the population, owing to the dependence of development upon improved communications and upon the progress of the people in agri-

66

POPULATION AND ECONOMIC REGIONS

culture. The interlocking of the political divisions hinders the development of a unified system of railways in this region.

(5) *Central Africa*. Largely as a result of its physical conditions, this region, which is under French, Belgian, and Portuguese control, is at a lower stage of economic development than that last considered, and has a lower density of population. Its outstanding feature is the Congo basin, where there is equatorial rain forest in the central region, surrounded by savanna; in the south of this division there is a tendency to aridity. Especially in the Cameroons, where considerable altitude is combined with heavy rainfall, and in the jungles of the Congo basin itself, development is necessarily difficult. The rubber production, for example, is small, and is still largely of the 'wild' type. Attention, however, is now being given to the more open lands forming the eastern and southern rim of the basin, where savanna occupations can be encouraged and mineral wealth exploited. Much depends upon the improvement of communications. The Congo, with its falls avoided by railways, is still an unsatisfactory line of movement. The northern interior of the region is still inaccessible, but in the southern part considerable importance attaches to the line from Lobito Bay running to the Katanga district, which is also linked up with the South African railway-system. On the east the western branch of the Rift Valley helps to form the boundary of this economic area, the communications of which lead out mainly to the Atlantic.

(6) *East Africa*. This region, covering the greater part of the Lake Plateau and the area east of it, also contains a considerable variety of relief and climate. In addition to the savanna plateau, there are the plateau slopes, a large section of the Rift Valley, and a relatively broad coastal plain. This last, with a considerable rainfall of the monsoon type and deltaic rivers, is densely forested. Kenya merges into aridity on the north, but a political division is taken as the boundary. It may be noted that the boundary with Italian Somaliland was the subject of adjustment in 1925. The region is under British control, and active European penetration has been pursued in Tanganyika Territory

AFRICA

(formerly German East Africa). Old-established Arab interests remain, centring in Zanzibar, and serious administrative problems have arisen through white settlers having occupied the higher and therefore more temperate districts. There is a variety of products, including recent introductions such as coffee and sisal hemp. Communications trend eastward, and it is noteworthy that Uganda, although within the Nile drainage system, carries on almost the whole of its



FIG. 30. KILINDINI HARBOUR FROM THE MAINLAND

The improvement of harbours and the provision of railways have been essential to the modern development of Africa. Note the single-line track common to most African railways.

Information Office of H.M. Eastern African Dependencies

trade through Kenya, and for this reason is included in the economic unit of East Africa.

(7) *Madagascar*. This large island, a French possession, is an obvious unit, although it contains diversities of relief and climate. Communications and external trade are poorly developed at present. Certain outlying islands, such as Mauritius and Réunion, are, for their size, of much greater economic importance.

(8) *Southern Africa*. Apart from Portuguese East Africa, this large region is part of the British Empire, and includes the Union of South Africa. There is a very great diversity of relief and climate and vegetation, as the relevant maps will show. It is the part of Africa where white settlement is most definitely established. It includes the greater part of the Zambezi basin, as well as the Limpopo and Orange

POPULATION AND ECONOMIC REGIONS

systems. Political interest and railway development are among the chief reasons for the demarcation of this economic region. The importance of Portuguese East Africa in connexion with the external relations of the Rhodesias, Nyasaland, and the Transvaal is obvious from the map. The Union of South Africa has a more fully developed railway-system than any other part of the continent, and the "Cape-to-Cairo" line from Cape Town to the Upper Congo may be regarded as a unifying link. South-West Africa (a Union mandate) is now in rail connexion with the Cape Province, and there are important railways inland from the eastern ports. Mining development is an important feature of this region, which contains in particular the main resources of the continent in coal, gold, and diamonds. The chief railway-terminus, Cape Town, is a very important nodal centre for shipping, while Durban also serves an extensive hinterland. The whole of this region keeps the same standard time—that of 30° east of Greenwich.

OVERSEAS COMMUNICATIONS

The overseas trade of Africa as a whole is mainly with Europe. Developing continents like South America and Australia can have little to offer Africa, where the demand is mainly for manufactured goods. Africa's trade across the Indian Ocean is slight. India and Japan are conveniently situated to supply cheap cotton goods to East Africa, but the amount of trade is not great, and little passes in return except coal from Durban to India. There is an absence of shipping-lines to South America, but the United States makes considerable demands upon West African palm-products, cocoa, and minerals, as well as upon Egyptian cotton, and supplies Africa with large quantities of machinery, especially mining machinery, as well as automobiles and oil. West African and South African products come very largely to Britain, which sends in return a variety of manufactured goods. French African trade is mainly with France. The numerous political divisions and the peculiar development of railway communications have led to many ports, scattered

AFRICA

along the coast, often concentrating the bulk of the trade of a considerable area. Such, for example, are Casablanca, Lagos, Durban, Port Sudan, and Alexandria.

Africa has two great nodal points in connexion with world-shipping—Port Said and Cape Town. Port Said commands the short route between Western Europe and the Indian Ocean, Cape Town the longer route, and these two are, from the point of view of the shipping visiting them, the busiest ports of the continent, although the volume of trade is in neither case commensurate with the tonnage.

North-west Africa is specially important, as there passes by it both the traffic going by the Cape route and that between Western Europe and South America; notable ports of call include the Canary Islands, the Cape Verde Islands, and Dakar. A call is often made at Freetown, at the entrance of the Gulf of Guinea from the North Atlantic. Places serving the Indian Ocean include Durban, where coal is available, and Mauritius, often visited on the way to and from India.

Submarine cables link the principal ports, important points for such communication with Europe being Alexandria and Cape Town. St Helena is a junction for cables to South America and Cape Town, the Canary and Cape Verde Islands being other junctions in the Atlantic. On the east Zanzibar and Durban are noteworthy, these being linked with Mauritius for connexion with the Far East.

Wireless stations are now numerous, though their power varies considerably. This form of intercourse is valuable for communicating with isolated administrative posts.

The development of air services is necessarily slow, as the making of ground preparations, particularly the provision of landing places, presents considerable difficulty. Nevertheless, considerable progress has been made; and, while this form of transport cannot economically serve trade in bulky goods, it provides an important means of rapid communication over the long distances and physical obstacles of the continent. The Belgians have notably developed this form of communication in the Congo Basin. The French operate an important route, Toulouse—Casablanca—Dakar; thence connexion is established with Brazil.

POPULATION AND ECONOMIC REGIONS

There are also French routes across the Sahara from Algeria to the Niger and the Guinea coast. The air mail from England to Cape Town goes to Alexandria, whence flying-boats follow

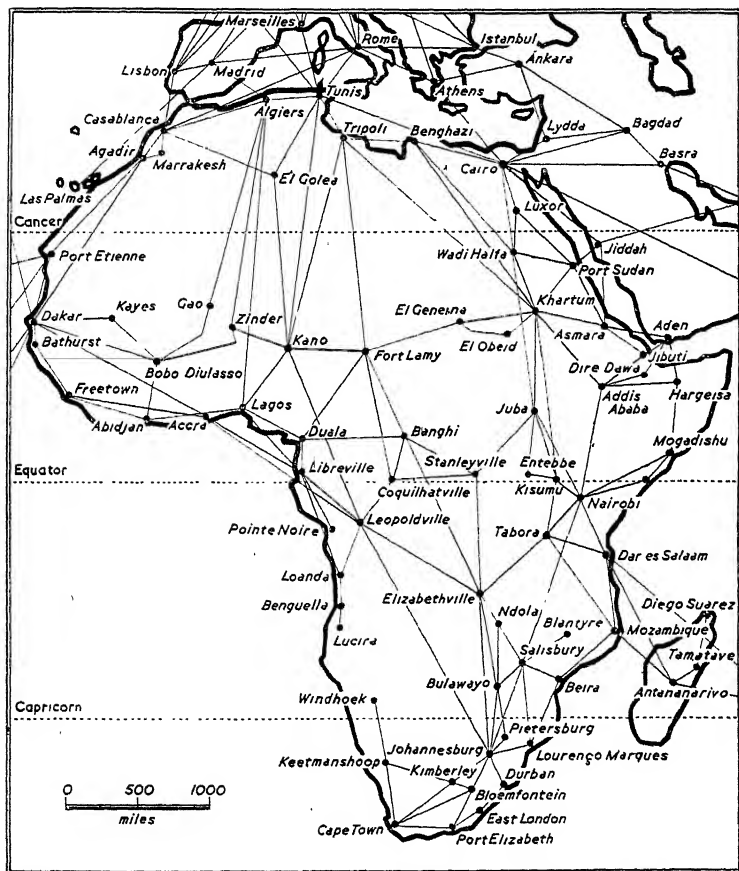


FIG. 30A. CHIEF AIR ROUTES, 1948

the Nile to Lake Victoria and then the east coast to Lourenço Marques and Durban, linking with Cape Town *via* Johannesburg and Kimberley. For these and other routes see Fig. 30a.

CHAPTER III

NORTH-WEST AFRICA AND THE SAHARA

GENERAL CONSIDERATIONS

MOST of this area, which covers about 3,000,000 square miles, is of little economic value, only some half a million square miles in the Atlas region being important from that point of view. Nevertheless, the Sahara, which forms a barrier between North and Central Africa, has its historic links with the Mediterranean Sea, and since the present political control operates mainly southward from French North-west Africa and from Libya it may be conveniently included with the lands to its north. It is bounded on the south by the Sudanese zone, the present-day interests of which lie chiefly southward and westward. On the east the desert continues into the Nile lands, where the Anglo-Egyptian boundary is used to define the region. In the west Spain holds a coastal strip of the Sahara, but the greater part of the arid region is under French control.

Physical Features. The chief physical features are the Atlas belt of young folded mountains, separated from the main plateau of the Central Sahara by a belt of depression running from Mauritania¹ to the Gulf of Gabes, and continuing along the Libyan coast, except where the Barka plateau projects into the Mediterranean Sea.

The Atlas Mountains constitute a unique structural feature in Africa. Ridged up in late Secondary and early Tertiary times, they are physically continuous with the Alpine mountain folds of Europe, with which they were at one time connected in the west across the Strait of Gibraltar

¹ This was the old Roman name for Morocco, but the French apply it to the region north of the Senegal river.

AFRICA

and in the east, *via* Sicily, with the Apennines. The core of the Atlas system is in the High (Great or Snowy) Atlas of Morocco, with a central mass of Archæan rocks, reaching a height of over 14,000 feet in the peak of Likumt. Lying to the south, and separated from the High Atlas by the Wadi Sus, is the Anti-Atlas, of somewhat lower elevation, while eastward run two roughly parallel ranges, rarely reaching 6000 feet, the Tell Atlas and the Saharan Atlas, which respectively terminate at Bizerta and Cape Bon. Branch-

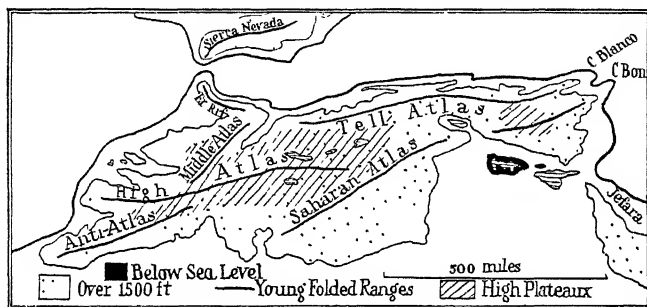


FIG. 31. GENERALIZED PHYSICAL FEATURES OF THE
ATLAS REGION

ing from the Tell Atlas are the Rif Mountains, which curve round to the Strait of Gibraltar and were formerly connected with the Spanish Sierra Nevada. A very important feature is found in a broken third range, the Sahel of Algeria, running between the Tell Atlas and the sea, and well defined north of the Wadi Chelif. The belt of coastal lowland with the Sahel constitutes the Algerian Tell.

Between the two main ranges is the Plateau of the Shotts, consisting of the High Plateau diversified by the shotts, which, when dried up in summer, gleam white owing to deposits of salts. The elevation of this plateau is largely over 3000 feet, but it sinks in the east central region to the depression containing the Shott el Hodna. The Saharan Atlas sink steeply to a limestone plateau at their southern foot, and contain the Aures massif, which reaches a height of 7600 feet. Wild gorges characterize the Saharan barrier.

NORTH-WEST AFRICA AND THE SAHARA

At each end of the Atlas system there is a coastal lowland, rather narrow in Morocco, but of substantial width in Tunisia. Geologically the Atlas ranges are distinctive in Africa in that they are a highland region built largely of relatively recent sedimentary rock, mainly limestone. Ancient crystalline rocks are well developed in the High Atlas of Morocco, where intense folding and subsequent denudation have exposed Archæan and Primary rocks. The Shotts Plateau is covered with sandy alluvial deposits largely saline in character.

The greater part of the Saharan region lies below 1500 feet, but there are a number of large depressions, while a great central belt exceeds this elevation. The line of depressions separating the Atlas region from the main Saharan plateau includes the Adrar area in Mauritania (El Juf), the Tuat depression with Gurara, and the region marked by the Shott el Jerid and the Shott Melghir, the latter being some 100 feet below sea-level. The Bodele depression occupies a large area in the Chad Colony.

In the Central Sahara is the Ahaggar massif, connected southward with the massif of Aïr, and flanked on the north-east by the Tasili plateau. From here an elevated belt runs south-eastward through the War Mountains and the Tibesti highland to Dar Fur in the Sudan. This high heart of the Sahara only in a few places exceeds 6000 feet. It broadly represents the crystalline foundation of Africa, a relic of the ancient plateau of a higher level. Primary rocks flank the higher parts, and there is much intrusive granite, as well as volcanic rocks, particularly well represented in the Aïr massif. The lower parts of the Sahara have much younger deposits, with large areas covered with derived material either stony or sandy in character.

The Sahara has only a 'fossil' river-system, a system of 'wadis,' or occasional streams, with the principal focus in the Ahaggar-Tasili highlands. These represent the immature river-system developed during the time of the glacial epoch in Europe. In the Atlas region are short rivers, with a considerable winter flow of water, which provide the only drainage to the sea in this large geographical division. Most notable among the rivers of the north-west are the Sebu

AFRICA

in Morocco, the Chelif in Algeria, and the Mejerda in Tunisia. The shotts of inland drainage illustrate the aridity of the plateau region on the inner side of the Tell Atlas.

The coast is inhospitable, and there are few good natural harbours. It is regular in outline, and silting and the distribution of land-waste have necessitated artificial assistance in modern times to make the ports available for shipping. The best access to the Atlas region was provided by the Mejerda valley, which debouches on to the Tunisian littoral, and it was here that Carthage and Rome established themselves most firmly.

Climate. In the Atlas region Morocco is open to Atlantic influences, and is therefore somewhat differentiated climatically from Algeria and Tunis. It not only contains the highest relief, which stands in the path of the depressions which visit the whole area in winter, but is particularly affected by the cool Canaries Current, which substantially reduces the summer temperature of the coastal region, and is the cause of frequent coastal fogs. The humidity of the air is high, especially in summer, when moist air carried inland is responsible for heavy dews, which provide a considerable amount of moisture of great value to the cultivator. The water is coolest off Cape Ghir, and its effect is illustrated by comparing the figures for Algiers and Mogador:

TOWN	HIGHEST MEAN MONTHLY TEMPERATURE	LOWEST MEAN MONTHLY TEMPERATURE	ANNUAL RANGE
Algiers .	75° F.	49·5° F.	25° F.
Mogador .	68·5° F.	57° F.	11·5° F.

The current is obviously effective in reducing temperature in the summer, while the lower winter temperature at Algiers may be attributed partly to its being somewhat removed from the direct Atlantic influence and partly to its somewhat higher latitude. Farther east, in much the same latitude as Mogador, Tripoli ranges from 54° F. to 80° F., the figures for Tunis in between being 48·5° F. and 78·5° F.

NORTH-WEST AFRICA AND THE SAHARA

The mean temperature at sea-level for the hottest month varies from 75° F. to 80° F. along the Mediterranean coast, and exceeds the latter figure in the interior, while that for the coolest month exceeds 48° F. everywhere. Modification due to altitude is illustrated by Constantine (2165 feet) and Géryville (4280 feet), the lowest mean monthly temperatures of which are respectively 43° F. and 39° F.; the mean temperatures in summer are less affected, owing to the great insolation through a dry atmosphere.

South of the Saharan Atlas comes a sharp increase in the mean temperature of the hottest month, Biskra's figure being 92.5° F., while that for In Salah, half-way between the Atlas and Ahaggar regions, is stated to reach nearly 99.5° F. This is probably the hottest part of the Sahara at this season. The lowest mean monthly temperatures do not greatly differ from those of the Mediterranean margin. The annual range in the Sahara is large, in places exceeding 40° F.

The daily range of temperature away from the coast is everywhere considerable, and in the Sahara is very great indeed. On particular occasions ranges reaching nearly 70° F. have been observed. In the Shotts region a minimum of 18° F. has been noted, and though this low figure is not reached in the Sahara, night frosts in winter are not unknown. Individual summer maxima up to 136° F. have been known to occur, with a sand temperature reaching 170° F., but summer nights are cool only in comparison with the heat of the day. These excessive variations are due to the low relative humidity and absence of vegetation, though that there is actually a good deal of moisture in the air is shown by the frequent deposition of dew.

The rainfall of the Atlas area is mainly effected by depressions forming in the Mediterranean Sea in winter and by the southward extension at this season of eastward-moving storms from the Atlantic. Away from the coast the amount is not considerable, except on the seaward slope of the mountains. The effect of the Canaries Current in reducing rainfall is illustrated by Mogador, which has only 13" of rain, the six months from April to September inclusive contributing only 1.6"; the annual rainfall of Marrakesh, well

AFRICA

inland, barely reaches 10". At higher elevations, however, there is a rapid increase, and on the mountains the precipitation is better distributed throughout the year.

The best-watered part of the Mediterranean coastlands extends from Algiers to Bône, with generally over 30" of rain. A belt east and west of Oran and the coastlands of Tunisia have little more than half this amount, but 30" is again reached in the Tangier area.

The Barka plateau, projecting northward into the Mediterranean, has a share of this winter rainfall—probably as much as Tunisia. The precipitation often takes the form of violent storms, very destructive in their removal of soil from the surface.

Away from the coast the rainfall depends upon altitude and exposure. Constantine is relatively wet, with 22", but the Shotts Plateau has a total precipitation of from 10" to 15", the amount generally decreasing eastward. South of the Saharan Atlas the rainfall is immediately reduced. Biskra has barely 7". Farther in the desert rain comes only in rare storms, but there is an amount sufficient to feed a large number of wadis in the central belt of highlands. At Biskra the fall is largely in winter, but the storms intercepted by the interior highlands occur mainly in summer.

It should be noted that in the north-west mountain area snow will lie during the winter as low as 3000 feet, while the High Atlas at their maximum elevation carry snow for the greater part of the year. Snow is even known to rest intermittently on the highest parts of the Ahaggar massif.

In front of the depressions passing eastward across the Atlas region blows a southerly wind from the interior of the land—the sirocco—a dry, hot wind, with its humidity further lowered and its temperature raised as it descends to the coast. It may bring with it a good deal of dust; this is especially the case in Morocco.

Vegetation. As it is warm enough throughout the year (except on the high elevations) for plant growth the character of the vegetation depends primarily upon the amount and distribution of the rainfall. The indigenous vegetation of the Atlas region is distinct from that of the rest of the

NORTH-WEST AFRICA AND THE SAHARA

continent, being allied to that of the adjacent part of Europe. The coast districts and mountain-slopes were originally well wooded, but forest-destruction throughout the historical period, supplemented by the removal of the surface soil by torrential rain, has left only comparatively small forest areas, chiefly on the seaward slopes. Afforestation work is now carefully carried out by the French. The trees and shrubs are typically drought-resisting, the growing period being the winter rainy season, though deciduous trees are found at the higher elevations. Palms occur in the Tell, with the cork-oak, olive, and Aleppo pine. There is also a good deal of waste land, covered with prickly shrubs known as *maquis*. The olive, which is indigenous to this region, provides in its distribution a useful clue to that area which receives sufficient rainfall to be marked off from the semi-desert. On the slopes at varying elevations are found the cork-oak, other oaks both evergreen and deciduous, cedar, argan (producing a fruit rich in oil), thuya, juniper, and pine, with large areas of *maquis*. The French have made numerous plantations of eucalyptus, especially in malarial districts—for example, round Blida. A growing occupation is the production of *crin végétal*, a fibre obtained from a dwarf palm the growth of which is widespread. It is specially useful for mattresses and upholstery, being vermin-proof, and is chiefly sent to Central Europe.

The Shotts Plateau has too little rain for forest, and may be described as the alfa steppe, from the widespread occurrence of alfa (halfa, or esparto) grass. This is a coarse, drought-resisting grass which grows to two or three feet and turns brown in summer. It is widely used by the natives for making rope, baskets, and mats, and is exported for the manufacture of good paper. Drought-resisting shrubs and various grasses are scattered about the alfa steppe, and succulent, salt-loving plants occur in the neighbourhood of the shotts.

The south slope of the Saharan Atlas has little vegetation ; in the ravines may be found a few trees, but generally there is only a scattered xerophilous growth. This merges into the vegetation of the Sahara. In the desert the sandy

AFRICA

wastes are generally devoid of vegetation, but in some districts there is a widely scattered, low growth of alfa, tamarisk, and other plants, particularly in the beds of the wadis, but nowhere covering the ground with a continuous carpet of plants. The central highlands, on the other hand, support a relatively good pasture. At the oases there are extensive plantations of date-palm, "with their feet in water and their heads in hell," which provide not only fruit, but a little timber for building, palm-wine, and, from the leaves, material for making mats and bedding.

Animal Life. The Sahara not only cuts off the typical flora of Ethiopian Africa from that of the Mediterranean margins, but makes a similar division of the fauna. It is true that the lion, panther, and leopard remain in the more remote parts of the Atlas region, as do simian representatives, but the characteristic herbivorous animals of the great African grass-lands are absent. European types predominate, and include such animals as the bear, wolf, and fox, while characteristic birds are the snipe, plover, and stork. Even the fish in the rivers are either peculiar to the region or of European type.

People and Development. The basic element in the population of the whole of this division is Berber, the name given to the modern representatives of a white (Hamitic) race that occupied North Africa in prehistoric times. They are represented in relative purity to-day by the Tuareg of the Central Sahara and in the less accessible parts of the Atlas Mountains, notably by the Kabyles and by the Shawiya Berbers of the Aures massif.¹ The Semitic Phœnicians established Utica at the Mejerda mouth (it is now six miles from the sea) about 1100 B.C. This settlement was succeeded by Carthage, created about 800 B.C. Following the Punic Wars, Rome established her hold over the Atlas area, developing a network of roads, particularly in the eastern half, and promoting widespread irrigation. The second important element in the population came with the Moslem Arabs, who

¹ These have been well described by M. W. Hilton-Simpson. See *The Geographical Journal*, January, 1922, May, 1924, and January, 1925. Fair skins and blue eyes are met with among them.

NORTH-WEST AFRICA AND THE SAHARA

invaded North Africa from the East in the seventh century and impressed their rule and religion upon the greater part of the region. Normans, crusading knights, Portuguese, and Spaniards made temporary impressions upon the coastal regions, and the Turks for a time exercised a loose control in the sixteenth and seventeenth centuries, retaining nominal control until quite recent times. An enormous slave-traffic was developed across the Sahara with the Mediterranean states, and after the expulsion of the Moors from Spain piracy became a dominant interest of the coast towns, menacing all the shipping in the Western Mediterranean. The corsairs were finally suppressed with difficulty at the beginning of the nineteenth century. The Berber language has largely given way to Arabic. The population of the towns is now almost all half-caste (referred to as Moor), though negroes are also found both here and at the oases.

The modern history of this part of Africa dates from 1830, when France took possession of Algiers and military conquest was followed by deliberate colonization. Numerous Spaniards, Maltese, and Italians followed the French into Algeria, and Tunisia, which had long been coveted by Italy, already had a large Italian population when it became a French protectorate in 1881. Another important element in the population is the large number of Jews, some of ancient settlement, others driven from Spain and Italy. Morocco as a French protectorate is much more recent, and here Spain has a footing in the north on the Strait of Gibraltar, as well as in the desert on the coast to the south. The French have penetrated the Sahara from the north and from Equatorial Africa, while Italy secured "a place in the sun" by taking Libya from Turkey in 1912. The pacification of the whole area has been difficult, and is still barely complete in Morocco and the Western Sahara.

In its early history under Carthage and Rome the Atlas region was famous for its grain and fruit. During the Middle Ages, when the Arab civilization was in its hey-day, it maintained a standard of culture that was in many respects superior to that of Europe, though agriculture and Roman irrigation-works fell into neglect. Civil and other wars pro-

AFRICA

moted stagnation if not degeneracy, and at the time of the French occupation there was but a poor standard of agriculture and productive activity, which, so far as the native cultivator is concerned, is still low, especially in Morocco. The region was, in fact, largely pastoral. The French authorities, however, are conserving the forests, have promoted modern irrigation, encouraged the better cultivation of the characteristic crops, such as barley (a very important cereal) and wheat, and vastly extended the cultivation of fruit, notably olives and vines, as well as other varieties for which the Mediterranean climate, allied with irrigation, is suited. Considerable attention is being paid to the cultivation of cotton, though the production is not as yet very important. The oases have been developed, and fresh ones created by the tapping of artesian water in the southern territories of Algeria and Tunisia. Experimental agricultural stations have been set up, and active measures taken to deal with insect and other pests, including steps to restrict the scourge of malaria.

Similar measures have been taken in regard to stock. The typical domestic animals are sheep and goats, and both are receiving scientific attention for the improvement of the breeds. The Syrian sheep is most common on the plateau, but there are one or two varieties that are closely allied to the merino type. Cattle, horses, asses, and mules are also reared, as well as camels.

Of outstanding importance has been the recent development of the mineral wealth of the Atlas region. Large areas of phosphatic chalk are exposed in Morocco, Algeria, and Tunisia, and the total phosphate output now exceeds that of the United States, though the quality of this important manure is not so good. The other important and widespread mineral is iron ore of excellent quality, while other metals are worked in smaller quantities. There is some evidence of oil, but it has not yet been found in commercial quantities.

The population is mainly sedentary in the Atlas region and at the oases, but it tends to be nomadic on the desert margins and on the fringes of the interior highlands. As a whole the Sahara will not admit of important economic

80

NORTH-WEST AFRICA AND THE SAHARA

development, for obvious reasons, though the French are energetically pursuing the search for underground water, and may to some extent increase the habitability of the region. Another limiting factor is dependence upon camel transport.

Communications have, of course, received much attention for both strategic and economic reasons. Algeria and Tunisia have a relatively good railway-system, there being an east-west main line (Tunis-Constantine-Algiers-Oran), now continued into Morocco, with several branches to various ports and to oases in the neighbouring Sahara. Morocco's railway-system is as yet immature, and the natural outlet of Tangier was late in securing a railway into the interior. Mineral development has led to the creation of lines radiating from Casablanca, and the railway-system has been simplified by the widening of the gauge of certain narrow lines, large sections of 60-cm. gauge having been originally constructed for military purposes. Desert transport is dependent upon the camel, of which two breeds need to be distinguished—the *jemal*, or slow, heavy beast of burden, and the *mehari*, or riding camel, tall and swift.

The growing importance of North Africa as a tourist region is reflected in the development of motor-roads, which, of course, have economic value as motor-transport for commercial purposes increases. It is possible now for the tourist to cross the desert from Algiers to Timbuktu in special cars, but this is not to suggest that the problem of desert-transport is solved, nor can it be said that there is any sound economic basis for the proposed Trans-Saharan railway. These things do, however, indicate that the desert may in future be conquered (p. 106).

A feature of the control of North Africa by the French is the success with which they have on the whole gained the confidence of the native populations by carefully respecting their traditions and customs (the slave-trade, of course, being abolished). This result naturally came after prolonged military campaigns, for Arab and Berber alike resented European intrusion. The early colonists in Algeria, who included many German-speaking Alsatians after the Franco-German War of 1870-71, met with great difficulties,

AFRICA

for many wild animals—panthers, hyenas, and wild cats—remained, and malaria was rife in large areas, while crops suffered alternately from drought and torrential rain. In Tunisia semi-nomadic tribes were for a long time very unruly. The European population appears to be increasing, settlement by French nationals being specially promoted in Tunisia and Morocco. The Nordic elements among the colonists do not seem to be well suited to this region, but South European types, like the Spaniards and Maltese, do much better, and maintain a considerable birth-rate.

As in so many parts of Africa, the fortunes of the agriculturist fluctuate with the rainfall. The variations of yield are very great. In 1920 Algeria produced 185,000 tons of wheat and in the following year 919,000 tons. The heavier rainfall that promotes a good yield of wheat seems to assist the development of mildew on vines, and the year with a good yield of wheat often results in a low production of wine, and *vice versa*. It is noteworthy that the quality of the wine produced is also dependent upon seasonal differences of climate.

MOROCCO

Morocco derives its name from the Arabic Maghreb-el-Aksa ("the Farthest West"). Of this country it was possible to write at the end of the nineteenth century that "there is no country near Europe so little known" and that it was a "monument of barbarism."¹ The Sultan of Morocco accepted the French protectorate in 1912, after five years of severe fighting, during which the French operated from Casablanca. But Spain was also interested, and the settlement of 1912 gave to that Power control of the Rif, except for the Tangier zone, which was internationalized.

The Tangier Zone

This district covers about 225 square miles; the town itself has about 60,000 inhabitants (Moors, Europeans, and Jews). Its peculiar international position arises from the

¹ *The International Geography* (1899).

NORTH-WEST AFRICA AND THE SAHARA

fact that it provides the natural port of entry into Morocco from Europe, situated as it is where the coastal plain of Morocco reaches the north coast. By a convention of 1923 it was to pass under the control of an International Commission as from June 1925, but the actual operation of this convention became in 1928 the subject of agreement between France, Spain, Italy, and Great Britain. In the meantime the port has rather stagnated, owing to important developments in French Morocco, although an improvement may be expected when the modern harbour under construction is finished. An agreement of 1912 involved the construction of a Franco-Spanish railway connecting Tangier with Fez; this was completed in 1927, but no noticeable trade improvement seems to have resulted. A proposal has been made that this line should be linked to the Algeçiras railway by a railway tunnel under the Strait of Gibraltar, thus providing a short route to French West Africa and lessening the sea journey to South America from France by a week.

Economic development in the Tangier zone is unimportant, the wheat, barley, and other crops grown being insufficient for the population. The town, however, has a considerable though apparently declining *entrepôt* trade, and in 1937 its imports were valued at £650,000 and its exports at £66,000. It is on the Toulon-Casablanca air route.

The Spanish Zone

This area is about 13,000 square miles. The population is estimated at 795,000. Tetuan has 50,000 inhabitants, Ceuta 39,000, Melilla 64,000, Larache (El Arish) 29,000, and Alcazar (El Kasr) 31,000. Most of the 45,000 Europeans live in the towns, as do most of the 13,000 Jews. The Rif Mountains run parallel to the north coast, and the tribes were only subdued with difficulty and with French assistance. The west coast has a fertile plain which can be irrigated from a number of wadis. In the mountains pastoral occupations prevail, sheep and goats being reared; there is a limited amount of agriculture in the valleys. The western coastal plain and that round Melilla depend upon primitive agriculture, growing chiefly millet, also barley and

AFRICA

wheat. Many poultry are kept, and eggs are exported; vineyards are common. Cork-forests remain round Larache and Tetuan, but are hardly exploited. The country is believed to be very rich in minerals. Near Melilla iron, zinc, and lead are

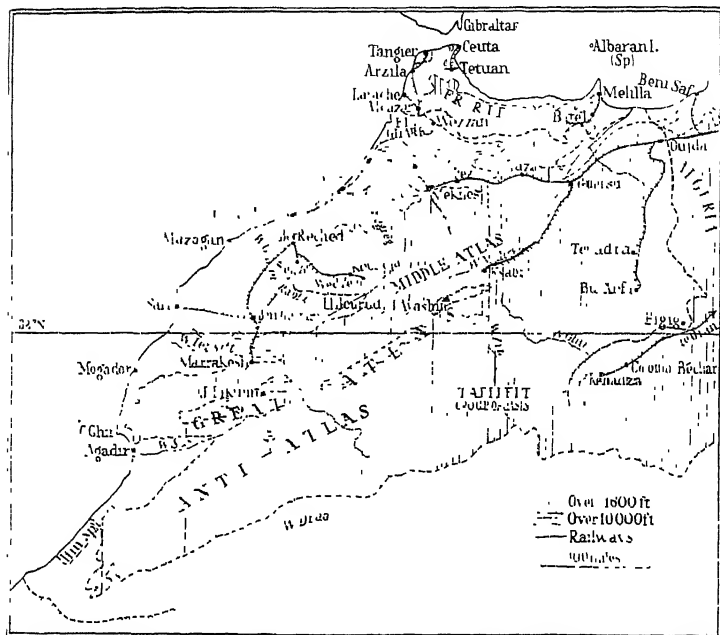


FIG. 32. MOROCCO

Casablanca's railways and the Tangier line should be noted. The railway that runs from Marrakesh to Oujda is part of a standard-gauge line that runs through the whole length of the French North African territories.

worked; the first has some importance. Short railway-lines run inland from Melilla,¹ Ceuta,¹ and Larache. That from Ceuta (a fortified town and the chief port) goes to Tetuan, the most important interior city and the centre of administration; that from Larache runs to Alcazar, through which the Tangier-Fez railway passes. Tetuan has some small industries—morocco leather, pottery, and tile-making; a

¹ These towns are actually Spanish possessions, included in Spain, but treated here for convenience as part of the Spanish protectorate.

NORTH-WEST AFRICA AND THE SAHARA

short railway connects it eastward with the open roadstead of Rio Martin. The trade, mostly with Spain, amounted in 1937 to £1,125,000, chiefly imports.

Spain also controls the enclave of Ifni, in the south of Morocco—about 1000 square miles. The rainfall is small, but irrigation permits the cultivation of dates, grain, and vegetables, while the coast villages engage in fishing. The Spanish hold on this area (of about 20,000 people) is loose.

French Morocco

The area of this French protectorate is estimated at about 160,000 square miles and the population at about 6,300,000 (173,000 French, 60,000 other Europeans, chiefly Spaniards and Italians, and 160,000 Jews, the rest being mainly Berbers and Arabs, but including also a number of negroes). Some 80 per cent. of the Europeans and most of the Jews live in the towns. The protectorate extends from the Atlantic, over the Anti-Atlas, High Atlas, and Middle Atlas, on to the Shotts Plateau, and into the Sahara in the south, where it is bounded by the Wadi Draa. North of this perennial streams run from the mountains through the Atlantic coast-plain, notably the Tensift, Um er Rabia, Bu Regreg, and Sebu, while the Muluya reaches the Mediterranean in the north. The coastal plain rises, at about 800 feet, to a plateau, not much higher, but of a steppe character because of its distinctly smaller rainfall. At the foot of the Atlas is a fertile and well-watered belt.

People. The French control of the native peoples in the higher regions is still somewhat loose. In general the population is pastoral, or occupied in relatively primitive agriculture. Large numbers of Arabs in the drier areas are nomadic. Many of the original European colonists came from Algeria and Tunisia, but more recent settlers from France have not always been successful, partly owing to drought. Some have returned to their native country. The colonists are largely engaged in fruit-growing, and by irrigation works the administration is promoting this occupation, besides having established departments for the

AFRICA

improvement of native agriculture and stock-rearing. There is important irrigation in the neighbourhood of Marrakesh and in the Um er Rabia valley, and other large works are planned in the Sebu and Muluya valleys, the former of which will water part of the lowland area known as the Gharb. Large stretches of Morocco have underground water, and this is being tapped for agricultural purposes.

Agriculture. There are some $3\frac{1}{2}$ million acres of forest remaining, mostly on the slopes of the Atlas, but some inland from Rabat and Mogador. These forests are being carefully conserved, the most important species in them being the cork-oak and cedar, but they have only local importance at present, although the production of cork has recently much increased. A good deal of esparto grass is exported.

The French have been careful to settle only a relatively small number of colonists, in order to interfere as little as possible with the established system of land-tenure. The agriculture is therefore mainly in native hands. The coastal plain has a fertile, black, moisture-retaining soil, and one of the best cultivated areas is the Gharb region round the lower Sebu. The other important cultivated belt is at the foot of the mountains. Barley is by far the chief cereal, followed by wheat, largely hard wheat. Maize, sorgho beans, oats, flax, chick-peas, are cultivated; coriander, cumin, and canary seeds are produced. Vines are important in the regions of Fez, Rabat, Meknes, and Casablanca, while there has been sufficient stimulus to olive-cultivation to obviate the necessity which existed until recently to import a certain amount of olive oil. Figs, oranges, lemons, and almonds are grown, oranges being specially important round Meknes and Marrakesh, where irrigation schemes are being developed. Cotton, which was widely grown in the eighteenth century, has received attention, and a little of poor quality is being raised in the Fez district. The cultivation of early vegetables for the European market is increasing, as also is wine-making. In the Saharan zone the oases are estimated to have about a million date-palms.

Pastoral occupations are of considerable importance, and the number of domestic animals has rapidly increased in

NORTH-WEST AFRICA AND THE SAHARA

recent years. Sheep number nearly 10 millions, goats $5\frac{3}{4}$ millions, and cattle nearly 2 millions. Asses and mules are very important for transport, and there are many horses and camels. The steppe belt is mainly pastoral; flocks and herds are moved up the mountains in summer. There are also many sheep on the Shotts Plateau. Fishing is an important coastal occupation, tunny, sardines, mackerel, and bonito being the chief species caught; curing is carried on at Fedhala, just north of Casablanca.

Minerals. Recent years have seen the working on a small scale of ores of iron, lead, zinc, and manganese. The iron ore, poor in quality, is found between Wed Zem and Casablanca, and again north-east of the former place. French Morocco is one of the few countries of the world producing cobalt, found some 100 miles south-east of Marrakesh. The annual output of phosphates, controlled by the Government, has increased from nothing in 1920 to well over a million tons in recent years. The location of this mineral, which exists in enormous quantities, and has a high phosphate content, is in a belt behind Casablanca parallel to the coast, indicated by Ber Reched, El Bourudj, and Kouridja. Another field in the hinterland of Safi has been developed.

Towns and Railways. France has developed the country chiefly from the port of Casablanca. This city of 260,000 inhabitants (including 45 per cent. of the Europeans) has had a remarkable growth. Like other Moroccan ports, it has a naturally poor harbour, but is now protected by two long breakwaters. It is rapidly increasing in importance as a fuelling-port, and, being the centre of French penetration and of the railway-system, and having the phosphate area in its immediate hinterland, it has attracted the bulk of the overseas trade. Its industries include soap-making and sugar-refining, while superphosphates are manufactured, pyrites from Huelva in Spain being used. There is a large power-station in connexion with the electrified phosphate line, which runs south-east through Ber Reched, an important junction for Marrakesh (193,000 inhabitants), an ancient city surrounded by 8 miles of walls, in a fertile and

AFRICA

well-irrigated district near the upper Tensift. The line from Casablanca northward goes to Rabat (83,000 inhabitants), at the mouth of the Bu Regreg, the centre of French administration and the chief seat of the Sultan, and then on to Port Lyautey (Kenitra), the second port, serving the Gharb, situated seventeen miles up the Sebu, which is obstructed by a bar. Beyond the line goes to Petit Jean, where the Tangier railway joins, to Meknes and Fez. Fez



FIG. 33. IRRIGATION TANK AND DATE-PALMS, FIGIG

Irrigation is the basis of oasis cultivation.

Photo R. N. Rudmose Brown

has 145,000 inhabitants, and is famous for its copper- and brass-workers and wool-dyers. The line goes on through Taza, which is linked up with the main Algerian line through Oujda. A considerable proportion of the import trade is by this route. A branch running south from Oujda serves a small coal-field. Railway improvements in recent years have included the electrification of all lines west of Fez.

Mazagan, Mogador, and Agadir are ports of local importance. Safi has perhaps the best natural harbour in Morocco and a railway to the Ben Guérir phosphate field; it is likely to grow in importance.

The oases of Tafilelt and Figig are noteworthy. The

NORTH-WEST AFRICA AND THE SAHARA

former is the principal caravan centre of Southern Morocco, and is watered by two perennial streams from the Atlas; it is really an irrigated area covering some 400 square miles. The latter lies in the south-east corner of Morocco, hemmed in by mountainous cliffs; it is the largest of the North African oases, and has been described as "a sea of Zenaga palms." The oasis contains several towns. It is just within Morocco, and is a few miles from the neighbouring railway running south from Oran in Algeria.

A daily air service links Casablanca with Toulouse, and it has a regular service to Dakar.

Trade. Imports in 1937 were valued at £14,500,000, and in 1938 at £12,300,000; the corresponding export values were £9,300,000 and £8,700,000.¹

The leading imports in value are sugar, petrol, and cotton goods, valued respectively in 1937 at £1,340,000, £900,000, and £500,000. Automobiles (£385,000), iron and steel goods, machinery, tea, and coal were also large items. The leading export in recent years has been phosphates, the value of which in 1937 reached nearly £2,000,000. In a year of good harvest there is a large export of wheat or barley. Eggs often provide a large export; wool, hides and skins, animals, almonds, canary seed, *crin végétal*, and vegetables are also exported. France sends some 40 per cent. of the imports and takes about 45 per cent. of the exports. Spain is a big customer. The United Kingdom exchanges cotton goods and coal for barley, phosphates, and almonds.

ALGERIA

Algeria proper covers about 80,000 square miles, stretching across the Atlas to include the piedmont oases. There are three administrative divisions (departments), centring on Oran, Algiers, and Constantine. The Southern Territories, extending to the Ahaggar, have a separate administration and cover 770,000 square miles. The total population, including about 640,000 in the Southern Territories, is

¹ Throughout this book the French franc has been converted at the rate of 125 to the £ sterling for 1937 and 170 for 1938. Later figures, affected by war conditions, have not been used.

AFRICA

nearly $7\frac{1}{4}$ millions. Of the 987,000 Europeans considerably more than half are of French origin, and many more are other Europeans who have adopted French nationality. Spaniards number about 130,000, Jews 75,000, Italians 24,000, and Maltese 4000. Some three-quarters of the natives are Berbers. The population in 1846 was barely $2\frac{1}{2}$ millions, and then included about 110,000 Europeans.

The large administrative divisions of Algeria proper rank as departments of France, each sending a representative to the French Chamber. Natives may become French citizens,

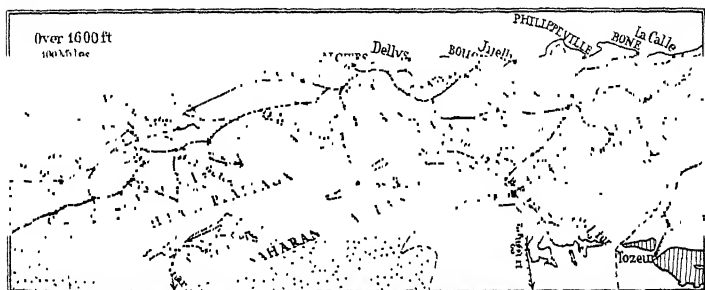


FIG. 34. THE ALGERIAN TELL AND THE HIGH PLATEAU

but as they have local representation very little advantage is taken of this. All the Jews are, by decree, French citizens.

The comparatively small area of lowland is mainly coastal, but the Tell is by no means a plain, being diversified by broken ranges—the Sahel—largely composed of crystalline and volcanic rocks, behind which are the principal valleys, opening out to the coast and responsible for the value of the ports strung along the coastline. Chief among these lowland areas are the Metidja Plain, commanded by Algiers, and the Sig Plain, the chief outlet of which is Oran; in the latter lies the swampy area marked by the Sebka d'Oran, a large shott. The Plain of Bône is another important area of this type. Among the rivers the Chelif is outstanding; in its valley are two important irrigation schemes. The rivers barely manage to struggle to the sea in summer. The coast ranges are broken by deep gorges, and both they and the Tell Atlas present serious obstacles to communication.

NORTH-WEST AFRICA AND THE SAHARA

The Tell naturally is the region in which most of the agriculture is carried on and most of the population live.

The High Plateau is bordered on the south by the difficult barrier of the Saharan Atlas, the northern slopes of which are partly forested (though less so than those of the Tell Atlas), and whose southern and very barren slopes lead steeply down to a limestone piedmont area marked by the Wadi Mزاب and by the Wadi Jedj, which loses itself in the desert as it trends eastward. These southern ranges are broken by areas of relatively low land projecting northward into the plateau containing the Shott el Hodna, to the east of which rise the Batna Mountains and the Aures massif. Between these two groups the Wadi Biskra has cut the famous gorge of El Kantara as it drains to the Shott Melghir.

People. The Europeans are mainly colonists and farmers, who own some 23 per cent. of 25 million acres of cultivated land, and the map showing the distribution of Europeans in Algeria is at once an indication of the relief and the rainfall, for they largely occupy the best lands. Though outnumbered by the natives in the proportion of seven to one, the Europeans contribute heavily toward the total production; it is estimated that the European farmer gets a yield from his land at least twice as great as that obtained by the native farmer. Important among the Berber population are the Kabyles, who in their strongholds round Bougie resisted all invaders until the French subdued them in the middle of the last century. They are monogamous, and their women go unveiled. They depend mainly upon careful agriculture, but their villages are over-populated, and their men-folk constitute a big element in the supply of native labour in Algeria. The chief language is now Arabic.

Resources. The forest area covers nearly 9 million acres, but much of it is of the *maquis* type. The principal cork-forests are behind Bougie and Philippeville. There is a relatively small total area of cedar. Aleppo pine and evergreen oak constitute the largest forests. The forests supply fuel, timber for local purposes, such as railway-sleepers, and bark for tanning. The greater part of the area of Algeria is suited only to pastoral pursuits.

AFRICA

Wheat, mainly hard wheat, and barley rival each other as the principal cereal crop, though oats are also widely grown. These winter crops, the basic food of the population, may or may not provide a big surplus for export, according to the season. Maize is also cultivated. Truck-farming has attained considerable dimensions, especially in the hinterlands of Algiers and Oran, and large quantities of early vegetables (artichokes, tomatoes, potatoes, beans, and peas) are raised. There is a very large production of wine, but the quantity varies greatly with the season; in 1937 there was a yield of 340 million gallons of wine from nearly a million acres of vineyards. Much of it is consumed locally, and much is exported to French colonies, and to France for blending purposes. A good deal of the wine, however, is not suitable for blending, owing to high acid content. In recent years there has been a great increase in the production of tobacco for both local and export trade, and a considerable manufacture has arisen. A big yield of olive oil is obtained from some nine million olive-trees. Flax is grown, and efforts are being made to promote the production of cotton. Some attention is given to mulberry cultivation for silkworm-rearing; the Government is assisting this industry.

Fruits are extensively grown; oranges, especially mandarins, grown by colonists, plums, figs, citrons, pomegranates, almonds, and bananas are all important. Irrigation schemes help this development. In the oases of the south the growing of dates for export is being rapidly developed.

Large natural tracts of alfa remain, especially in the Oran province, on the High Plateau, but here pastoral occupations prevail, as in the highlands generally. The proportions of the domestic animals are similar to those of Morocco; there are more than 6 million sheep, $2\frac{3}{4}$ million goats, and 800,000 cattle. Live sheep are largely exported, an attempt is being made to build up a trade in mutton, and there is a large wool clip. The coastal fisheries have some importance. Sardines, anchovies, and tunny are caught, while sponges and coral are collected.

Minerals. Extensive deposits of high-grade iron ore are worked along the Wadi Tafna, behind Beni Saf, and in the

NORTH-WEST AFRICA AND THE SAHARA

hinterlands of Algiers, Bougie, and Philippeville; the deposits at Wenza, near Constantine, are particularly important. The production has varied, but latterly increased, and in 1937 exceeded 2 million tons. Phosphate of lime is extensively worked in the Constantine province along a line stretching east and west from Setif, and farther south, in the neighbourhood of Tebessa, are vast deposits still awaiting full development; these deposits are continued eastward into Tunisia. The annual production reaches some 600,000 tons. Considerable quantities of zinc are raised in the neighbourhood of Batna, kieselguhr is obtained in the Oran province, and the mineral output includes lead and very small quantities of coal, copper, alabaster, and oil.

Manufactures are not important in Algeria. Superphosphate plants are met with at Bône and Philippeville, and tobacco factories, flour-mills, and oil-refineries exist in the principal coast towns. Native crafts include carpet-weaving, pottery, and leather-work.

Towns and Railways. Algiers, the largest city in North-west Africa, with more than 257,000 inhabitants, has a poor natural harbour, like most of the coast towns, but was for long the headquarters of the Barbary corsairs. It now has modern protection for shipping and harbour facilities, and has become the great commercial centre, dealing with nearly half the total trade. It lies encircled by hills, and the modern town contrasts strangely with the Casbah, or native city, so picturesque, if not otherwise attractive to the European. It exports both Tell and plateau products, as well as dates and iron ore, and is the principal centre of the big tourist traffic that has sprung up. In recent years its trade has not grown as rapidly as that of Oran. Oran (195,000 inhabitants) has a good natural harbour, and is an important port for iron ore and phosphates, besides serving a fertile area and engaging in trade with Morocco and with Saharan oases *via* the railway to Colomb Bêchar. Philippeville and Bône are the chief phosphate ports, and there are a number of other ports of little more than local significance, such as Bougie, Mostaganem, and Beni Saf. The chief interior city is Constantine (population, 107,000), situated in a position of

AFRICA

extraordinary beauty and grandeur, almost surrounded by a deep and narrow gorge, crossed at one place by a natural bridge. This town is in a rich grain-growing district. Best known among the oasis towns is Biskra, a growing tourist centre, with date-groves and orchards and a caravan terminus on the railway to Tuggurt—like Old Biskra, a mud town. Tuggurt, at the time of the French conquest, was decaying owing to the filling up by the desert sand of the numerous wells upon which it depended. The French have driven

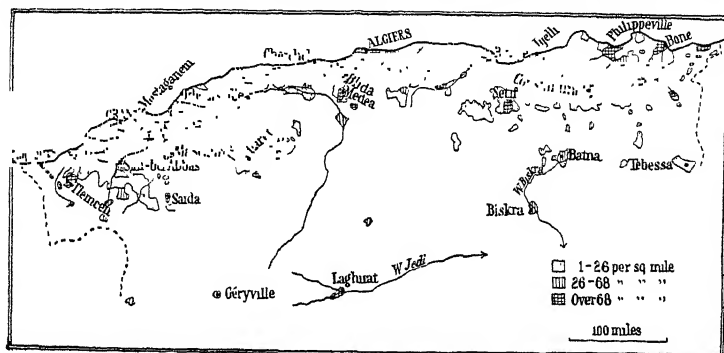


FIG. 35. DENSITY OF EUROPEAN POPULATION IN ALGERIA

Note the concentration in the hinterland of the larger ports.

Based on a map in "*L'Algérie économique*," by V. Demontès

many new wells in this area. One boring in this neighbourhood at a depth of 600 feet produced a flow of 10,000 gallons per minute, creating an oasis now possessing 80,000 palms. The principal city of the Mزاب country (the piedmont, inhabited by a strict Mohammedan sect) is the oasis of Ghardaia, an important sheep-market. Other important oases are Wargla, Ain Sefra, and Laghuat.

The old Roman road-centre of Tebessa and the famous ruins of Timgad are not the least of the attractions of Algeria for the tourist. Tlemcen and Blida are notable Moorish cities.

The railways, supplemented by more than 4300 miles of national roads, have a total length of more than 3000 miles, and are characterized by lines running inland from the coast. The main line, however, is roughly parallel to the coast from

NORTH-WEST AFRICA AND THE SAHARA

Tunis into Morocco, passing through Algiers and along the Chelif valley, where the farming centres of Orleansville and Perregaux are situated. These places are centres of cotton-growing, which, however, is not yet well established.

An air service connects Algiers with Marseilles.

Trade. In 1937 the value of the trade was as follows: imports, £32,700,000; exports, £34,700,000. France has an overwhelming proportion—nearly 80 per cent.—of the total. Textiles, chiefly cotton goods, machinery and tools, sugar, and automobiles, headed the list of import values in that order; the value of the textiles was £2½ millions and that of automobiles £500,000. Nearly all of these items were imported from France. Other large imports are leather, coal (including much for bunkers), oil, iron and steel, coffee, and soap. Wine is by far the leading export; its value in 1937 was nearly £13,500,000, while wheat, sheep, spirits, fruit (largely dates), tobacco, wool, olive oil, iron ore, zinc, lead, phosphates, alfa, *crin végétal*, and cork were all of importance. France took almost all the wine, all the sheep, and a large proportion of most of the other exports. Most of the alfa export comes to the United Kingdom, but some now goes to France.

THE REGENCY OF TUNISIA

Tunisia, still under the nominal rule of a bey, who inherits his position from the period of Turkish control, covers nearly 50,000 square miles, with a population of about 2,600,000, of whom 108,000 are French, 94,000 Italians, 7000 Maltese, 60,000 Jews, and the remainder chiefly Berbers and Arabs. As recently as 1911 Italians were twice as numerous as the French; the status of the Italians is still in dispute between the French and Italian Governments, and the latter long coveted the control of the regency. Efforts have been made to settle more colonists from France, but the nominal excess of the French over the Italians has only been secured by granting French citizenship to other Europeans and in other ways. In the town of Tunis itself Italians outnumber French. A political difficulty arises from the unwillingness of Italy to allow her nationals to become French.

AFRICA

Tunisia faces the sea on two sides. Physically it consists of the extreme end of the Atlas highlands, with the adjacent lowlands, separated from an upland region in the south by the Shott el Jerid, which is well below sea-level and

represents, with the Shott Melghir, an earlier extension of the Gulf of Gabes. The Mejerda, flowing into the Gulf of Gabes, separates two of the Atlas ranges, and is the most noteworthy river. Several regions may be distinguished: the Algerian Tell, with the adjacent and relatively well-watered mountains, continuing into Tunis; the irrigated Mejerda valley, with its cultivated alluvial plains by the Bay of Tunis; the Cape Bon peninsula; the Sahel, which is the name applied to the broad eastern lowland; the plateau occupying the west

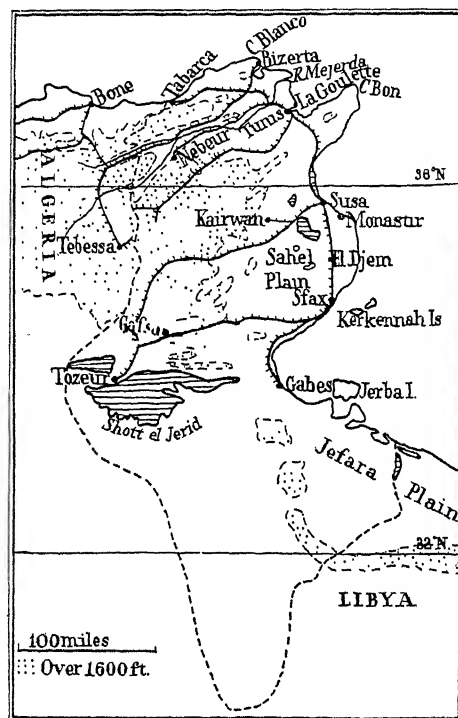


FIG. 36. TUNISIA

of the northern half of the country; and the Saharan region of oases in the south. The northern part has the best rainfall, but this declines in the south of the Sahel to only 10 inches. Indeed, the Sahel is drier than the Shotts Plateau, and the pastures are very scanty. The Saharan area is largely dependent upon underground water, but it is noteworthy that numerous large springs of both hot and

NORTH-WEST AFRICA AND THE SAHARA

cold water gush out from the limestone of the mountains, watering rich oases in the neighbourhood of the shotts. Jerba Island shares the characteristics of the opposite mainland.

Production. Since the establishment of the French protectorate in 1881, and the settlement of numerous colonists, many nomadic pastoral tribes have been pacified and a policy of agricultural development and education pursued. The forested slopes and alfa steppes found in Algeria continue along the highlands. Cork, briar-wood, and alfa are all exported. Wheat is the chief cereal crop, followed by barley. Oats are very much less important. Though extensive vineyards are found, the production of wine is barely 8 per cent. of that of Algeria, but the olive crop is immensely greater. Olives are chiefly grown in the Sahel, despite its aridity and absence of running water; there are now over 16 million trees, two-thirds of which are in bearing. Tunisia specializes in olive oil, the high quality of which is guaranteed by the Government; inferior oil is imported for the poorer classes. Citrus fruits are specially grown on the fertile soils of the Cape Bon peninsula. There are some 2½ million date-palms in the country, almost half being in the oases of the Shott el Jerid region, while there are 400,000 in the Gabes oasis and a similar number on Jerba Island. The Degla variety is specially cultivated for export. Almonds, pistachio-nuts, and henna are other crops.

Sheep number over 3 millions and goats over 1½ millions, while the other typical domestic animals are also reared, pigs, however, being very few in number. The attention given to stock is illustrated by the fact that the number of domestic animals nearly trebled between 1911 and 1937. Pastoral tribes keep their flocks on the poor lowland pastures in winter and drive them up the mountains in spring. Camels number about 150,000, and are still used to a considerable extent in native agricultural work. Fishing is not extensively pursued; the usual Mediterranean varieties of fish are caught; sponges have some importance.

The mineral output is large. The phosphate production in the vicinity of Gafsa is some 1½ million tons annually,

AFRICA

being greater than that of French Morocco and far greater than that of Algeria. The production of iron ore, however, is normally less than half the Algerian output; it comes chiefly from the Kairwan district, where zinc and lead are also mined. There is a considerable production of salt by evaporation along the coast. Industries are unimportant; they include milling, oil-refining, and soap-making. Indigenous crafts in wool and leather include carpet-weaving.

Towns. The principal town is Tunis, with 220,000 inhabitants. This port is the successor of Carthage, and lies at the head of the Gulf of Tunis, on a shallow lagoon through which a channel for shipping has been cut. This lagoon was once the outlet of the Mejerda river. It serves the Tell, the plateau, and the Cape Bon peninsula, and, being in the north-east corner, between the eastern and western Mediterranean basins, is favourably situated for Mediterranean traffic. It does a large general trade, and is the leading port as regards the number and tonnage of the vessels using it. It attracts large numbers of tourists, for among the resources of its hinterland are the remains of many Roman and pre-Roman towns. Carthage lies some 12 miles to the north-west. The outlet of Tunis is La Goulette, at the entrance of the lagoon, a fishing port. Air routes link Tunis with Marseilles and Rome. Tunis is connected with the main Algerian railway, and southward through Susa (a port for the Sahel) and El Djem (which has a vast Roman amphitheatre) with Sfax. The immediate hinterland of Sfax is a dry pastoral region, apart from its olive-groves, but a narrow-gauge railway runs inland to Gafsa, where the principal Tunisian mineral deposits are located. The value of the traffic passing through Sfax is as great as that through Tunis. It is also the chief centre of the sponge-fisheries.

Inland from Susa a railway-line runs to Kairwan, the old Mohammedan capital, with a magnificent Grand Mosque built from materials obtained from earlier Roman buildings, and to Tozeur, near the Shott el Jerid. This oasis has 200,000 palms, as well as groves of oranges and pomegranates. The only other towns of importance are Bizerta, on the north coast, a naval and military station, with a

NORTH-WEST AFRICA AND THE SAHARA

large inner harbour, and in an excellent strategic position, and Gabes, at the head of the gulf of the same name, with a perennial stream running through a belt of palms about 4 miles long and 1 mile wide.

Trade. The figures for 1937, based on 125 francs to the £ sterling, are as follows: imports, £10,600,000; exports, £7,120,000.

Textiles, chiefly cotton goods, valued in 1937 at £1,650,000, are the largest import, other large items being sugar, machinery, sacks, oil, coal, motor-cars, coffee, tea, and tobacco. Grain and grain products headed the list of exports, as it often does in a year of good harvest; it reached nearly £2 million. The phosphate export was valued at £1¼ million, somewhat exceeded by the value of crude metals, chiefly iron and lead. The olive-oil export also exceeded £1 million. Wine, alfa, dates, cork, and sponges were also notable. France does some 60 per cent. of the trade, both import and export, Algeria and Italy having a considerable share of the remainder.

THE FRENCH SAHARA

The Sahara¹ is by no means uniform in its physical features. Highlands and basins occur, and although the term 'desert' may be applied to it as a whole, there are important differences in the surface characteristics. Thus there are the *erg* deserts of shifting sand-dunes, typically, though irregularly, developed in a great belt from Mauritania to Southern Tunis and again east of the Aïr massif. The *hamada* or sandstone deserts are bare areas of rock especially found round the highlands of the interior. Elsewhere are the *reg* deserts, covered with boulders and stones and extensively developed in the Tanezruft region, west of the Ahaggar.

The Ahaggar massif may be regarded as an important water-parting in that it marks the divide of considerable drainage systems that were being developed during the glacial epoch. Wadis now occupy deep valleys, the erosion of which was arrested by desiccation. Especially noteworthy

¹ See *Le Sahara*, by Professor E. Gautier.

AFRICA

is the Wadi Igharghar, which, it is believed, formerly drained to the low shotts of Southern Algeria, and the Wadi Tafassaset, which drained the eastern part of the Ahaggar massif to the Niger, receiving the river of Agades from Aïr. It seems probable that the elephants used by the Carthaginians, which were obtained by them from the lowland shotts region, crossed the Sahara *via* the Ahaggar massif. In the northern



FIG. 37. THE WADI SAURA AND KERZAZ OASIS, TO THE SOUTH OF BENI ABBES

A remarkable feature of this wadi is that it separates the desert on the one hand from hamada desert on the other.

Professor E. Gautier and the Algerian Government Photographic Service

valleys of the Ahaggar degenerate crocodiles have been found. There is evidence that desiccation has continued to the present time. Another drainage feature is found in the numerous wadis draining southward from the Atlas Mountains, which flood during the winter. At Beni Abbes the Wadi Saura floods several times a year. Sometimes the wadis provide water for the oases, but very important also is the vast quantity of water that lies underground in this part of the Northern Sahara. Wadis from Tibesti drain to the Bodele depression, which formerly appears to have been filled with water from Lake Chad.

NORTH-WEST AFRICA AND THE SAHARA

Intense insolation through clear skies by day and great radiation during the starry nights account for variations of temperature which cause the fracturing and splintering of rocks. Wind has been effective over a long period in modifying all surface features and in wearing down fragments into sand. Intense heat gives rise to the wind-storms, known as simooms, which fill the air with sand and drive fine particles into the pores of the skin. Rare rain-storms—brief but intense—can do little or nothing to modify the prevailing aridity. On the southern margins, toward the West African region, the average rainfall (summer) is a few inches per annum, and gives rise to a scattered drought-resisting growth. The highlands are noteworthy for a small rainfall, which may come at any season, and which gives rise to streams that are perennial in their upper courses. Snow rests temporarily in winter on the highest parts of the Ahaggar, where there is a modification of temperature probably amounting to 12° F. in comparison with the surrounding Sahara. Good pasture for goats, sheep, asses, and camels exists in these highlands.

There is a considerable diversity and mixture of peoples in the Sahara. Broadly speaking, latitude 17° N. separates Arab and Berber from negroid types. Thus in Mauritania Arabs and Berbers are found in the north and blacks in the south. Ahaggar and Aïr are inhabited by the Tuareg, "the people of the veil," an extraordinarily interesting Berber type. The men go veiled, scorn manual work despite their strong frames, and constitute a race of camel-men who long dominated the chief Saharan caravan routes. They have only recently been subdued by the French. They are not numerous, and it seems probable that they will die out; the only occupation that appeals to them is marauding, and they are mixing more and more with negro types that the slave-trade has brought to the oases. To the east, in the Bodele and Tibesti regions, the inhabitants are chiefly Tibbu types—Hamitic negroes, and the only negro people to maintain themselves in the Sahara—with a sprinkling of Arabs. In the north and west Arabs are chiefly found—settled Arabs, living in flat-roofed mud houses, at the oases,

AFRICA

and nomadic types, living in tents, wandering in the semi-desert from well to well. The need for pasture and water has largely contributed to the unruliness of the Saharan peoples, and their resistance to European penetration has been frequently aggravated by a fanatical Mohammedanism. The last stronghold of the slave-trade was the Wadai region, lying east of Lake Chad. The French now have complete control of the Sahara, with the exception of an unpacified region in the north-east of Mauritania.

Political boundaries are necessarily somewhat vague. In the west is the French colony of Mauritania; the Southern Territories of Algeria spread to Ahaggar, south of which is the northern part of the Niger Territories, including the districts of Aïr and Kavar; and the Chad Colony, reached from Equatorial Africa, cover the regions of Kanem, Bodele, Borku, and Wadai.

Mauritania

Though included here Mauritania is politically part of French West Africa. It is bounded on the south by the Senegal and on the north by Rio de Oro. It contains no considerable elevation; the coast is marked by sand-dunes, behind which are salt lagoons. The area is about 347,000 square miles and the population about 386,000, with a few hundred Europeans. There is a little rainfall in the south, which produces a belt of bush savanna, but the important part of this region is a strip, about 25 miles wide, by the Senegal which receives an annual inundation from the summer flood. This is known as the Chemana. Here Sudanese hoemen grow maize and millet, and the French are attempting the cultivation of cotton, sisal, and castor oil, but development is hindered by lack of labour. In the southern region zebu cattle, sheep, goats, asses, and mules are reared, and acacia-gum is collected. Arabs and Berbers are found in the interior oases, notably the Adrar group of oases, cultivating principally dates, but also rearing camels and Barbary horses. Dates are exchanged for Chemana products. Considerable quantities of salt are obtained from

102

NORTH-WEST AFRICA AND THE SAHARA

interior saline pools (*sebka*) and from the coastal lagoons, and this industry, which has always been important in connexion with trans-Saharan traffic, could be considerably increased. An important fishing industry, developed chiefly by Breton sailors off Cape Blanco, has grown up. Fish—dried, salted, and smoked—is exported from Port Etienne in very large



FIG. 38. THE OASIS OF IN SALAH

This oasis is located among shifting sand-dunes. The sheet of water is artesian.
Professor E. Gautier and the Algerian Government Photographic Service

quantities; it is sent inland, and to the French West African colonies and the Belgian Congo.

Southern Algeria

These territories contain the *erg* deserts in the north, with the region of wadis and plentiful underground water that has already been discussed in connexion with Algeria. The tapping of underground water has been extended far to the south, to the great benefit of the oasis regions of Gurara and Tuat, in which Adrar and In Salah are respectively located. Farther south is the Ahaggar massif, with its peripheral villages of hardened clay houses, its wadis, and its upland and valley pastures. There is little cultivation.

AFRICA

The Tuareg breed camels, and there are large flocks of goats and sheep, as well as asses and a few zebu cattle. This region, mainly of *hamada* and *reg* desert, was finally conquered in 1903. A rich tomb dating from A.D. 600 suggests that it once held a more prosperous population.

The Niger Colony

This colony is politically in French West Africa; the part in the Saharan region includes the Aïr plateau, with its wadis draining westward, and the oasis area of Kavar. Perennial streams, notably the river of Agades, descend from the peaks of Aïr, which exceed 6000 feet. This area is similar to the Ahaggar. The Tuareg inhabitants depend largely upon the milk and cheese of camels and goats. An ancient caravan route of considerable importance passed from Zinder through Agades and the Kavar oasis to Tripoli. In the north-west is Taodeni, the most famous salt-producing area in the Sahara. The southern zone bordering on Nigeria is a savanna belt chiefly inhabited by the sedentary Hausa, who cultivate millet, maize, rice, wheat, ground-nuts, tobacco, and cotton, and keep numerous flocks and herds. The colony (area, 490,000 square miles; population, 1,760,000) is administered from Niamey, which would become very important should it be served by a railway.

The Chad Colony

This colony (400,000 square miles, with about 1,000,000 people) is administratively part of French Equatorial Africa; the Saharan area includes the Tarso Mountains of Tibesti and the extensive Bodele depression, which stretches southward to Lake Chad. The Tibesti highlands share the characteristics of the Ahaggar and Aïr, except that cultivation is more important, as the population is to a greater extent sedentary and as there are large oases along the margins. In the great depression there is plentiful underground water, and wells are numerous; the limited rainfall on the southern margins permits pasturing. Here the dom-palm is common, and there appears to be a plentiful growth

NORTH-WEST AFRICA AND THE SAHARA

of wild cotton. Unfortunately, there is only too obvious evidence that Lake Chad is drying up; the inundations in summer—which vary in extent from year to year—show in general a progressive restriction. The water of Lake Chad is relatively fresh—often fresher than well-water; this is attributed to the enormous growth of aquatic vegetation absorbing the dissolved salts. Lack of water and the consequent lapse of cultivation allow windswept waste still further to reduce the area of the lake. Occupations are those

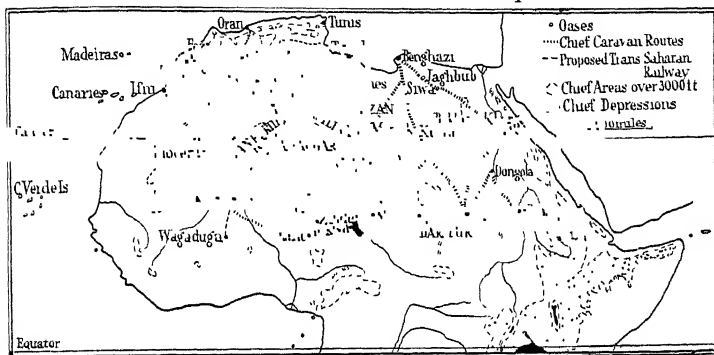


FIG. 39. THE SAHARA

typical of the dry savanna. The principal towns are Mao in Kanem and Abeshr in Wadai, both reduced by the French in 1903. These towns, especially the latter, were centres of a big and destructive slave-trade, and Abeshr commanded important caravan routes to Benghazi *via* Kufra and to the Nile *via* Dar Fur and Kordofan.

Saharan Routes

It is perhaps unnecessary to emphasize the dependence of desert transport upon the camel, the only animal that can cross the waterless wastes. The positions of oases decide the course of the caravan routes. In a region without obvious landmarks the sun and the stars are guides, and the desert training of the caravan-leader is of supreme importance. But caravan trade has shrunk to relatively small

AFRICA

dimensions; slave-trading has been all but abolished, and railways to the Mediterranean tap the Northern Sahara, while the Sudanese zone has had its traffic diverted westward and southward. Economic conditions would not yet seem to justify extensive railway transport. Nevertheless, it seems possible that the French may complete the construction of a trans-Saharan railway. The chief suggestion is to continue the existing line from Colomb Béchar southward round the western fringe of the Ahaggar, cut the Niger bend east of Timbuktu, and continue on to Wagaduga. The proposal is justified partly on strategic grounds, but mainly on the ground that Kabyles could be settled on the Niger for the purpose of growing irrigation cotton. It seems a less practicable scheme than that of linking the Niger bend with the existing West African railways.

LIBYA

In 1911 Italy invaded this Turkish *vilayet*, and in the following year it became an Italian colony. This region, which flourished when the Romans tapped and conserved its resources in water, had decayed under Arab and Turkish rule. The native tribes resisted Italian control, which became very precarious during the Great War of 1914-18, while the resistance of the interior oases was prolonged.

Formerly divided for administrative purposes into the two divisions of Tripolitania and Cyrenaica—still a convenient geographical division, based on the Gulf of Sidra—the colony was, in 1934, divided into four coastal provinces centred on the towns of Tripoli, Misurata, Benghazi, and Derna, together with a large military territory south of the coastal belt. The total area is about 685,000 square miles, with a population at the end of 1938 of 888,000, including 90,000 Europeans and 30,000 Jews. The native population is fundamentally Berber, but there is a very large proportion of negroes—possibly one-third—who are there as a result of the old slave-trade across the Sahara. Most of the Europeans are Italians, and these, with Maltese and Greeks, are chiefly found in the coast towns.

In Tripolitania is a coastal plain, the Jefara, of sub-

NORTH-WEST AFRICA AND THE SAHARA

stantial width, backed by a limestone plateau that merges southward into the red sandstone *hamada* desert of Homra, beyond which is the depression of Fezzan, a typical *erg* desert with oases. Cyrenaica has the narrow coastal plain of Benghazi that rises by three well-marked steps to the limestone Barka plateau (the Jebel Akhdar), which reaches 3000 feet. South of this is an arid depression that rises

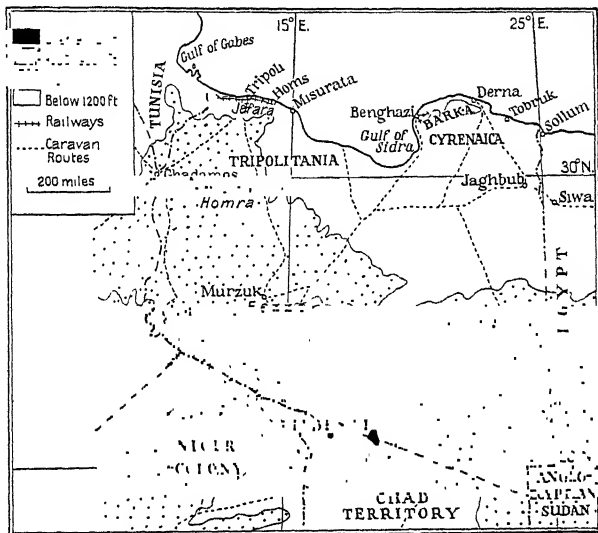


FIG. 39A. LIBYA

beyond to the sandstone plateau of the Libyan Desert, containing the Kufra group of oases, inhabited by a warlike Mohammedan confederation known as the Senussi and subdued in 1931 after a difficult campaign. The eastern boundary follows longitude 25° E., diverging somewhat in the north, where adjustments have been made by agreement with Egypt. The southern boundary is marked by a belt of much higher land, exceeding 9000 feet in the Tibesti highland. The territory as a whole is arid; the coastal rainfall, which comes in winter, is not large enough to yield surface streams except in the neighbourhood of Derna; the Barka tableland, the best-watered area, has remnants of former

NORTH-WEST AFRICA AND THE SAHARA

Winter storms render the coast unsafe, except where modern improvements have been effected. The principal towns are coastal, and the most important is Tripoli (population in 1940, 108,000, including 39,000 Europeans). Tripoli developed a large modern section and modern port facilities; although it has suffered from the general decline of caravan traffic, it is still the chief Mediterranean caravan terminus. It has many craft workers in pottery, weaving, leather, gold, and silver, is a busy market centre, especially for animals, and has a growing tobacco manufacture. Its communications include several short narrow-gauge railways to east, west, and south, and good motor roads to the other important coastal towns and to Ghadames. Next in importance is Benghazi (population in 1940, 64,000, including 19,000 Europeans), the poor roadstead of which was turned into a modern port. Besides its sponge- and tunny-fisheries and also its caravan trade, Benghazi serves the fertile Barka peninsula.

The trade is still small. Imports in 1937, swollen by public works, were valued at about £6½ million, and included particularly cotton goods, iron and steel goods, sugar, and coal—the coal and some cotton goods coming from the United Kingdom. Exports, mainly to Italy, were valued at about £1½ million, and included fish, sponges, dates, salt, barley, skins, henna, and early vegetables, with alfa (sent to the United Kingdom).

RIO DE ORO

This Spanish territory stretches from the Wadi Draa to Cape Blanco, covering about 109,000 square miles and having a very scanty population (including about 850 Europeans). The region is administered from the Canary Islands, but the control is loose. The region has little importance, but is believed to possess great mineral wealth. Villa Cisneros, the capital, is on the opening—a fine harbour—known as Rio de Oro, and on the Dakar-Casablanca air route. There are a number of oases, and a population, largely nomadic, of Arabs, Berbers, and negroid people. Fishermen from the Canary Islands and Brittany visit the coast.

AFRICA

THE ISLANDS OF NORTH-WEST AFRICA

Three groups of islands—all of volcanic origin—may be considered here. The Azores, rising out of a submarine ridge in mid-Atlantic, and the Madeiras belong to Portugal, the Canary Islands to Spain. The three groups lie respectively about latitude 38° N., 33° N., and 28° N. The Azores lie in the sub-tropical high-pressure area, but are sufficiently far north to be strongly affected by eastward-moving depressions in winter. The Madeiras and Canaries are in the trade-wind belt for the greater part of the year, but receive a certain rainfall from winter storms. The high relief is of marked assistance in increasing rainfall; this is least in the Canary Islands, which lie in the latitude of the Northern Sahara. The following table illustrates the principal climatic differences:

PLACE	HIGHEST MEAN MONTHLY TEMPERATURE	LOWEST MEAN MONTHLY TEMPERATURE	ANNUAL RANGE OF TEMPERATURE	RAINFALL IN INCHES
	$^{\circ}$ F.	$^{\circ}$ F.	$^{\circ}$ F.	
Ponta Delgada (Azores)	71	57	14	39
Funchal (Madeira)	72	59.5	12.5	27
Las Palmas (Canaries)	74	63	11	11

It will be noted that as one progresses southward the mean temperature increases, the annual range decreases, and the rainfall decreases, with a corresponding lengthening of the dry season.

The Azores are administered as part of Portugal, and consist of three groups—the eastern group with São Miguel, the largest island, the middle group with Pico, which reaches 8500 feet, and the western group with Flores. The total area is 922 square miles, and the population, some 253,000, has shown a tendency to fluctuate in recent years, owing to emigration to America. Temperate cereals as well as maize are cultivated, and considerable quantities of wine are produced. Many fruits are grown, but orange cultivation has

NORTH-WEST AFRICA AND THE SAHARA

almost succumbed to disease ; the yield of pineapples, however, is increasing. There are considerable numbers of cattle, which use the hill pastures in summer, and butter and cheese are produced. The local fisheries are important.

Destructive earthquakes are occasionally experienced. There are numerous hot springs, some of which have medicinal value. Mineral waters are exported, and many invalids and tourists visit the islands. The tourist industry seems capable of development.

São Miguel rises to 5600 feet, and contains the chief town, Ponta Delgada, sometimes a port of call of vessels on American routes. Fayal is an important centre of Atlantic cables, being linked with Brest, Lisbon, Halifax, and New York. The total trade is small, and largely passes through Lisbon.

The **Madeiras** are also administratively in Portugal. Besides the main island there are four small ones. The total area of 314 square miles carries about 210,000 inhabitants, giving a mean density more than twice that of the Azores, but similarly showing a tendency to fluctuation. One of the smaller islands, Desertas, is uninhabited ; the best known of the others is Porto Santo, the island first to be discovered (in 1418). There is little lowland, and Madeira rises in Pico Ruivo to 6500 feet. The tourist may descend the steep cobbled streets of Funchal in a wicker sledge. Well-wooded ravines and slopes remain, but the island has never recovered the forests that were set on fire shortly after the discovery, and which, it is said, blazed for seven years. The climate, which tends to dry heat in summer, is eminently suited to cereals and fruit. Careful terracing to conserve soil is an outstanding feature, and the water of the mountain streams is rigorously economized. The vine has been grown for five hundred years, and the wine export is specially important. Bananas and pineapples are included in the fruits produced, and so valuable are these cultivations that grain has to be imported, while sugar, once a leading crop, and introduced with the vine, is now little grown. Early vegetables for the European market are being increasingly produced. Many cattle are raised, and bullock

AFRICA

transport is common. The *carro*, or bullock-sledge, is a quaint feature of Funchal. Many women are engaged in embroidery and lace-making, and men in wicker-work and woodwork and the making of straw hats.

Not least among the assets of the island are the balmy winter climate, the picturesque ravines and mountain scenery, and the profusion of flower-gardens and orchards. Numerous invalids and tourists visit the islands, and much of the craft-work and import trade is connected with the large number of visitors. Funchal, with 75,000 inhabitants, is the only large town, situated on the slopes of a vast amphitheatre on the south side of Madeira; it is an important port of call on African routes. Separate trade figures are not available.

The Canary Islands. This is the largest of the three groups, and consists of seven islands, with a total area of 2800 square miles and a population of 609,000. Tenerife has 235,000 inhabitants, and Grand Canary 200,000. Hierro, Palma, Gomera, Fuerteventura, and Lanzarote are the other islands. They were vaguely known in ancient times as the "Fortunate Islands," and appear to have been originally inhabited by a race allied to the Berbers; they became Spanish in 1479.

The snow-capped peak of Tenerife rises to 12,152 feet; this volcano is not extinct, though normally quiescent. The islands have little lowland, which is perhaps fortunate, as the rainfall at the lower elevations is very small. The west side has more rain than the east, but the lower areas—of largely decomposed basalt—bear only a scant vegetation, and streams from the mountains are essential to cultivation. At higher levels are growths of laurel and oak, vegetation ceasing at 10,000 feet. The African coast is only 60 miles away from the most easterly islands, and a hot, parching wind from the Sahara is occasionally felt. A noteworthy feature of the Peak of Tenerife is that when the north-east trade-wind is blowing at the base the peak is often in the real anti-trade wind blowing as an upper wind from the south-west.

With irrigation bananas and dates flourish at the lower

NORTH-WEST AFRICA AND THE SAHARA

levels; higher up olives, vines, oranges, tobacco, and cereals are carefully cultivated, and immense crops of onions, tomatoes, and potatoes are produced. The onions are particularly grown for seed. The wine industry has declined, Cuba being the chief market to-day, and the red dye obtained from the cochineal insect (bred on cactus plants) is no longer very valuable since aniline dyes have been on the market, though there has been a slight recent revival because of its use in cosmetics. Bullock transport prevails, though camels are also used. The industries include embroidery, lace, and drawn-thread work, cigar- and cigarette-making (based upon tobacco from the Dutch East Indies and the United States), and fishing, which is of increasing importance. The fishing-grounds extend to Cape Blanco, and there is an export of dried fish to West Africa, as well as an export of tinned tunny, chiefly to Genoa. In addition, the tourist industry is extensive.

Commercially it is possible to divide the Canaries into two groups, each with its *entrepôt*—Las Palmas, on Grand Canary, in the eastern group, and Santa Cruz, on Tenerife, in the western group. This division corresponds to the political status, which is that of two provinces of Spain.

Grand Canary contains a remarkable extinct crater, the Caldera, a mile in diameter and 1000 feet deep; its highest point reaches 6000 feet. Las Palmas (population, 84,000) is situated in the north-east, in arid surroundings, though adjacent to it are many irrigated farms. Its port is Puerto de la Luiz, 3 miles away, protected by a sandy isthmus and a breakwater; it is an important port of call, accommodating large vessels and supplying them with coal and oil.

Tenerife, with its dominating mountains, possesses some magnificent scenery. Its capital, Santa Cruz (67,000 inhabitants), lies in the north-east, and has been made into a protected harbour. It supplies coal and oil fuel to many visiting ships, is increasingly visited as a health resort, and is the seat of administration of the group.

The trade is of considerable dimensions, though complete and separate figures are not available. Bananas, tomatoes, and potatoes are the chief exports, the first being the most

AFRICA

important ; they respectively reach an annual value of about £2,000,000, £1,000,000, and £160,000. The export of onion seed is of increasing importance ; most goes to the United States, the rest to the West Indies. The varied imports include coal and cotton goods from the United Kingdom, oil and iron and steel goods, largely from the United States, packing wood from North-west Europe, grain, fertilizers, seed potatoes, and many luxury goods for tourists. The coal (mainly British) supplied to ships has declined in amount in recent years to only a few hundred thousand tons. The use of the Panama Canal, the rivalry of mainland ports and of oil, all help to account for this. More than 12 million tons of shipping annually visit Las Palmas and Santa Cruz. A noteworthy recent development is the establishment of an oil-refinery at Santa Cruz, which port appears to be increasing its shipping trade relatively to that of Las Palmas.

As a cable-station, and in providing ports of call on South American and West and South African routes, the Canaries, with their active if poor population, stand considerably above the other two groups in importance. The prosperity of the people is mainly dependent upon the crop of fruit and early vegetables. Almost all the available cultivable land is utilized, and it is not surprising that there has been some emigration to Cuba and South America. The methods of intensive cultivation, involving terracing and irrigation, are very costly, and the land for bananas is among the most highly priced agricultural land in the world. Methods of both agriculture and fishing are primitive. The infant mortality is very high. (For Cape Verde Islands see Chapter VI, p. 204.)

CHAPTER IV

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

GENERAL CONSIDERATIONS

THE most important political and economic unit in the Nile basin is, and always has been, Egypt. This almost rainless land covers some 383,000 square miles, but the effective Egypt from the point of view of human settlement is an area of only 12,226 square miles, which is for the most part the area, including the delta, that can be irrigated by the Nile, though not all of this is as yet cultivated. This dependence of Egypt, and that of other areas to the south, upon the Nile water renders an understanding of the physical conditions of the Nile basin and of the *régime* of this remarkable river of the greatest importance for a proper appreciation of this part of Africa. From the point of view of historical geography Egypt, "the gift of the Nile," is remarkable in illustrating the physical conditions that favoured the development of early civilization. These conditions were:

(1) A regular supply of water, of course needing control, increased the value of temperatures that allowed the growth of crops all the year round, and a bountiful return for agricultural effort was thus assured. This provided a stimulus to progress in arts, and leisure, without which culture cannot flourish.

(2) Relative protection from invasion by people of a lower cultural development while the early civilization was growing was provided by the sea to the north, desert to the east and west, and to the south a middle and upper course of the Nile so obstructed that it was not an easy line of advance. Even to-day the communications of the Upper Nile lands are not northward, but eastward by rail and motor-road through Kenya Colony.

AFRICA

In recent years, and especially since the freeing of the Anglo-Egyptian Sudan from the tyranny of Mahdism, great attention has been given to the development of this region, more particularly in connexion with the possibilities of cotton production. The relatively inaccessible parts of the Nile basin to-day are, firstly, the Bahr el Ghazal region, where a transition from grass-land to tropical forest conditions takes place, and, secondly, the high basaltic plateau of Abyssinia, which is the source of some of the more important of the Nile tributaries.

Physical Conditions of the Nile Basin

The Nile, some 3500 miles in length from Lake Victoria to the Mediterranean, or 4150 miles if the Kagera be included, drains an area of 1,100,000 square miles. Lake Victoria, on the equator in the northern part of the Lake Plateau, receives the Kagera and minor streams. It is at a height of 3700 feet. A rapid descent, including the Ripon Falls, brings the Victoria Nile to Lake Kioga, and an even more abrupt descent, including the Murchison Falls, carries it to the north of Lake Albert, where comes in water from the western branch of the Great Rift Valley, at the head of which lies Lake Albert, draining Lake Edward and Ruwenzori by the Semliki river. The combined waters form the Albert Nile, or Bahr el Jebel. The valley widens toward the north. The steep banks of the gorge at Dufie (= "defile") are an exception. At Gondokoro, at a height of about 1500 feet, the river commences a meandering and swampy passage through the Sudan. At Lake No the Bahr el Ghazal with its swamps joins the main stream, having combined the drainage of the Bahr el Arab and numerous other streams that discharge water from the wet plateau area separating the Nile basin from that of the Congo.

It is along the Bahr el Jebel and the Bahr el Ghazal that the well-known accumulations of sudd (= "block") develop. In marshes, lagoons, and backwaters papyrus, reeds, and other water-loving plants flourish. This vegetation encroaches upon the river itself, and often completely

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

hides the channel. In such circumstances navigation is maintained only by clearing it away, a tedious operation involving the finding of the river-bed, the burning off of the top vegetation, and the cutting of the sudd into blocks, which are forcibly removed with the assistance of a steamer. It seems probable that the whole sudd region, extending eastward into Abyssinia, was once an inland lake which has been filled with alluvium by the annual flood of centuries.



FIG. 40. DINKA VILLAGE IN THE SUDD REGION

The rank, water-loving vegetation that often becomes detached in great masses in flood-time is well seen

Sudan Government

In the Bahr el Ghazal region are vast areas of alluvial flats which are alternately open grass-land in the dry season and under shallow water in the wet.

Below Lake No there are no significant left-bank tributaries, but on the right bank enter the Sobat, Blue Nile, and Atbara, tributaries of vital importance to the White Nile. They come from the Abyssinian plateau, a plateau mainly over 6000 feet, and with considerable areas over 10,000 feet, and consisting of enormous lava-flows superimposed upon Archæan rocks. The Blue Nile, rising in Lake Tana, is the most important of these tributaries, and between

AFRICA

its mouth and that of the Atbara occurs the first (called the sixth) cataract ; the " first " or lowest cataract is just above Aswan. The river in this stretch containing the cataracts is passing through a belt of Nubian sandstone, the rapids themselves being due to intrusive masses of granite, and the amount of alluvial land available for cultivation is very limited. Below Atbara no permanent stream reaches the Nile, although half its course is still to run.

Some way below Aswan the Nile enters a narrow and probably tectonic trough in the Libyan limestone—a trough filled with Nile silt—and within the limits of the cliff-like walls, to the eastern one of which the river tends to cling, is the cultivated strip known as Upper Egypt. This widens out below Cairo into the delta, the greater part of which is cultivated and has been so intensively canalized for irrigation purposes that of seven original mouths only two (Damietta and Rosetta) may be said to remain. The delta is known as Lower Egypt.

An important part of cultivated Egypt is the depression of the Fayum oasis, which receives water by canal from the Nile.

Climate. If the climate figures relating to places in the Nile basin given in the table on pp. 42 and 43 are studied they will give a good idea of the differences that obtain. A few supplementary figures are appended :

PLACE	MEAN TEMPERATURE		RAINFALL IN INCHES
	HOTTEST MONTH	COOLEST MONTH	
Berber .	° F. 93·5	° F. 67·5	None
Addis Ababa .	65·5	58·5	49·6 (mainly summer)
El Obeid .	86	67·5	14 (summer)
Wadelai .	82	76	43 (minimum, January–February)

The influence of latitude is plainly brought out when all the relevant figures are compared. The following points should be noted in addition :

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

(1) In the plateau regions and the drier areas there is usually a considerable daily range of temperature.

(2) The annual range of temperature varies chiefly with the character of the rainfall, the largest being experienced in the driest regions.

(3) In view of the fact that temperatures everywhere permit of cultivation all the year round it is desirable to pay most attention to the rainfall.

(4) Entebbe is an example of a place having rain all the year round, with a double maximum.

(5) The rainfall of the summer-rain belt is associated with the monsoon of the great continent lying to the east. Between about 5° N. and 18° N. northerly winds predominate during the winter months, but in the summer months southerly and south-westerly winds prevail, due to the influence of the Asiatic low pressure. The rainfall is largely of the kind associated with thunderstorms. Abyssinia naturally receives a heavy rainfall.

(6) As in all regions where the rain comes chiefly in one season, there are marked differences in the amount from year to year, differences which may mean prosperity one year and scarcity another. The following table illustrates this:

PLACE	TOTAL RAINFALL IN INCHES—MAY TO OCTOBER INCLUSIVE	
	1923	1924
Kosti . . .	17.5	12
Kassala . . .	18.5	11.5
Khartum . . .	13.5	2.75
El Fasher (Dar Fur)	12	20.5

(7) It is only to be expected that the Sudan rainfall should decrease northward toward the Libyan and Nubian Deserts, but it should be noted that large areas have sufficient rainfall for some form of cultivation. In the desert regions the occasional storms have no appreciable effect.

(8) Egypt is broadly in the dry belt, but a feature of its

AFRICA

climate in the north is the hot and dusty khamsin, which, blowing from the south or south-east, chiefly in spring and early summer, often dries up the leaves of growing plants. On the average it blows at Cairo on 11 days in the year. The rainfall of Cairo (1") and of Alexandria (8") shows that the delta is on the fringe of the winter rainfall of the Mediterranean basin.

The Régime of the Nile

In the early part of the year the rainfall of the Nile basin is at a minimum, and more than half the supply of water to the Lower Nile comes from the Lake Plateau. For several reasons the discharge of the Nile at Lake No varies only slightly during the year. The loss of water in the upper part of the Nile basin is so great that it has been estimated that only 0.1 per cent. of the rainfall of the basin above Lake No is discharged at that point.¹ Nevertheless, there is an appreciable summer flood past Gondokoro, although it has little economic significance. Lower down the Bahr el Jebel and along the Bahr el Ghazal, however, the accumulations of sudd spread the water out in shallow swamps, and this mass of vegetation assists in producing a tremendous loss of water by evaporation, the result of which is the very small discharge at Lake No, although this discharge is the chief winter supply of water to the lower river.

The Sobat brings down monsoon rain from Abyssinia, much of which is from the Atlantic and little from the Indian monsoon; there is but little winter snow to supplement the rainfall. Its discharge, beginning in May, causes a rise of 10-12 feet between its junction with the White Nile and Khartum.

The Blue Nile discharge is the most important element in the Nile flood. In August, September, and October it provides over two-thirds of the water of the Nile. It causes the Nile at Khartum to rise sharply at the end of May and to reach its maximum early in September, after which the fall is rapid. The rise at this point averages 22 feet, and the White Nile water is ponded up by a flood discharge that at

¹ Sir Henry Lyons, in *The Geographical Teacher*, Spring, 1910.

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

its maximum is some fifteen times as great as that of the main river itself. This damming-up prevents the White Nile from having more than a slight effect in producing the flood lower down, but at the same time helps to retard the

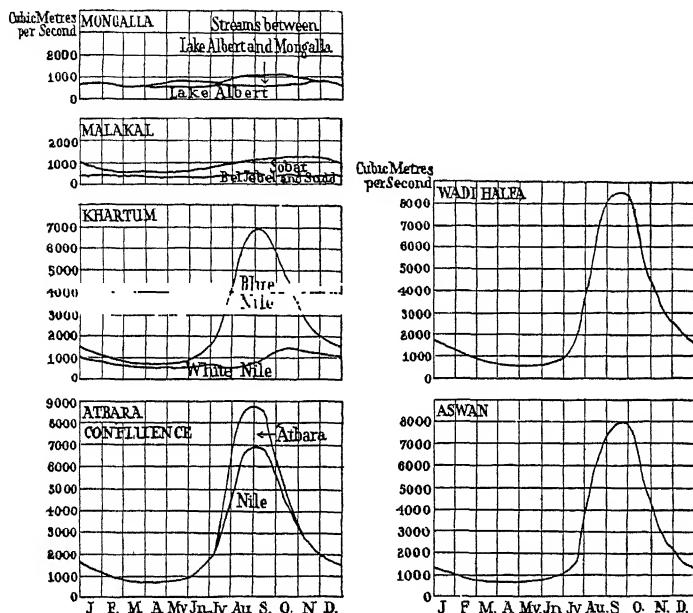


FIG. 41. AVERAGE DISCHARGE OF THE NILE, 1912-26

The maximum flood arrives at Aswan nearly a month later than it reaches the Atbara confluence; flood at Cairo is in C. the maximum only slightly

After Dr H. E. Hurst

fall in the Nile below Khartum after the Blue Nile has passed its maximum. Yet when the Nile is lowest, in April and May, 85 per cent. of its water is from the White Nile. The Blue Nile also brings down the bulk of the silt that is deposited in Egypt, for the Atbara lower down gives only a minor contribution and its discharge is a purely summer one, whereas the Blue Nile is able to maintain

AFRICA

a small winter flow, being regulated by Lake Tana at its source.

At Wadi Halfa the river continues falling until the middle of June, as it takes time for the flood-water to pass down the river. It rises rapidly until the middle of September,

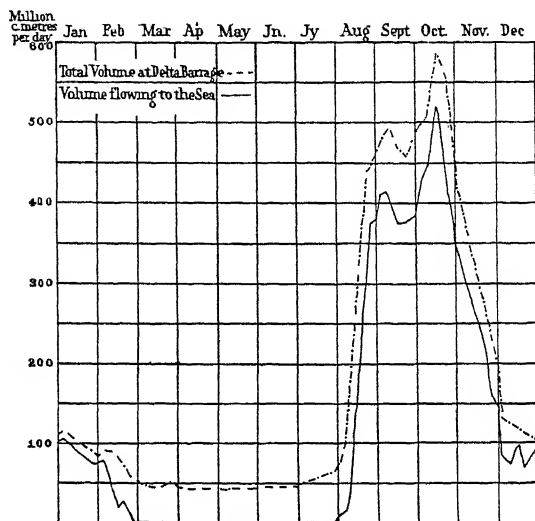


FIG. 42. VOLUME DISCHARGED BY THE NILE AT CAIRO, 1921

During the period of very low water, covering five months, there is little or no discharge into the Mediterranean Sea. It is plain that stored water is needed to irrigate summer crops.

After a diagram of the Egyptian Government

and then falls equally rapidly, although there is still a considerable flow even at the end of the year. The Cairo maximum occurs in October. All through its middle and lower track the Nile suffers great loss by seepage, evaporation, and irrigation, with the result that the amount of water it sends into the Mediterranean Sea, almost entirely by the Rosetta and Damietta mouths, is very small; indeed, when the Nile is at its lowest these mouths have to be artificially dammed to prevent an inflow from the sea.

Vegetation. Desert, grass-land, and forest are all repre-

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

sented in the Nile lands. Southward from the Egyptian frontier, the desert stretches well into the Sudan, after which the vegetation cover increases in luxuriance, with a corresponding increase in the animal life. Scanty grass and thorn-bushes lead on to richer grass-land to the south, with scattered trees and thickets, the trees including the baobab, the enormous hollow trunk of which is commonly used for storing water. Varieties of stunted acacia, producing gum, are found in the drier areas ; these have great economic importance. The change from grass-land to more luxuriant savanna or park-land conditions is indicated by a change in the huts of the natives, the mud dwellings in the drier parts giving way to thatched huts in the wetter. The camel and date-palm are typical of the desert belt ; farther south ostriches, cattle, and big game suggest the increasing luxuriance of the vegetation. Opportunities of cultivation without the assistance of irrigation increase southward, though it cannot be said that the Sudan is well cultivated at present. Elephants in the Southern Sudan and Uganda suggest the presence of forest conditions, and though the Lake Plateau is, broadly speaking, a savanna region, there is a good deal of forest. Bananas and ground-nuts are typical of this region.

Beyond the swamps of the Bahr el Ghazal the rim of the Nile drainage area merges into the equatorial forests of the Congo, where rubber and ivory are typical products. The Abyssinian Highlands show the influence of altitude ; the lower valleys are well forested, and are the home of the coffee-plant, suggesting tropical conditions ; temperate forest, much of it of a coniferous character, and temperate grass-land cover large parts of the plateau.

Insect-borne diseases affecting both man and beast are an important economic feature. Malaria occurs from Lake Victoria to the Mediterranean. In the swampy districts of Uganda sleeping sickness is a terrible scourge, though not so prevalent as formerly. The ravages of the tsetse fly in the areas below about 4000 feet particularly affect the keeping of domestic animals in the moister southern regions, so that, apart from modern transport developments, human portorage is essential. The infected tsetse fly has seriously

AFRICA

diminished the number of cattle in Uganda and the Southern Sudan, and unfortunately fresh districts are becoming infected. The locust may be a nuisance to the agriculturist of the grass-lands, and the ravages of the termite ant in the

moister south seriously militate against the use of wood.

People. The peoples of the Nile lands show considerable variety, and include even primitive pygmy tribes along the Semliki river and the Congo divide. Broadly speaking, the cultivators of Egypt (fellahin) are of Hamitic origin and the Bedouin Arabs are Semitic, but there has been much mixture of races. Although the Sudan is "the land of the negroes," the tribes of the northern part are largely Arab, and in the middle zone they show considerable Hamitic admixture, while the Bantu negro of part of Uganda also has Hamitic blood—*e.g.*, the Baganda, one of the most advanced of native tribes. The negro tribes proper, while they show various stages of culture, show great uniformity



FIG. 43. GUM-COLLECTING IN KORDOFAN

Note the S—' — : — ' typically tall,
:t.

Sudan Government

of physical characteristics—*e.g.*, in being tall and slim and possessing a thick mop of black hair. The Hamitic people of Egypt are careful cultivators; the negro peoples are seldom more than primitive gardeners and cattle-keepers. The Semitic tribes are pastoralists, and have long been a menace to the cultivators of the Lower Nile. Modern economic developments will, however, tend to make them more sedentary.

Irrigation and Agriculture

Egypt is "the gift of the Nile," and irrigation of a sort has been practised here for at least 7000 years. It depended of old upon the supply of flood-water, and was distinctly limited in scope. Modern engineering has greatly added to the economic development of both Egypt and the Sudan, and further projects will much extend this.

Basin Irrigation. The traditional irrigation of Egypt is the 'basin' or 'flood' method, with one flooding a year. The early summer in Egypt is the time of low Nile, and the latter part, reaching into autumn, is high Nile. Summer, with the ground baked or flooded, was a time of little cultivation, but the long strips of land stretching away from the Nile bank which formed and still form the ordinary holdings were carefully divided into 'basins'—pieces of land bordered by mud walls—into which the flood-water passed. As the basins near the banks filled the water was passed into basins farther from the river, and, if necessary, more remote basins were filled by means of the shaduf, the sakiyeh, and the Archimedes screw, simple appliances also used during the time of low Nile, though to-day modern pumps are often to be found. After lying on the land for some fifty days the water was allowed to drain off and the seed—wheat, barley, flax—was sown, the moisture, combined with the warmth of winter, being enough to raise the crop. The yield was largely determined by the area reached by the flood-water, itself dependent in amount on the rise of the river. The average rise at Cairo is 25 feet; the minimum is about 21 feet, a height which seriously limits the irrigated area; a rise of more than the normal, on the other hand, may do great damage to embankments. These traditional methods, together with rather primitive agricultural implements, still largely prevail in Egypt. Obviously only 'winter' crops could be produced by them in any quantity. The modern method of perennial irrigation has increased and fixed the area that can be cultivated, and has had the enormously important effect of making possible the production of great summer crops in addition to the winter crops.

AFRICA

Perennial Irrigation. Modern irrigation schemes were commenced without the more complete knowledge of the hydrology of the Nile that has been forthcoming during the last quarter of a century, and the need for further and properly correlated schemes is urgent. Egypt contains some large cities, and the urban population is increasing at a greater rate than the rural. Moreover, the demand for food-stuffs is augmented by the natural increase of population, estimated at 13 per cent. per decennium. To conserve more water, both for the purpose of extending the cultivated land

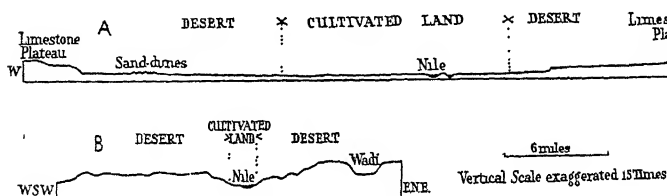


FIG. 44. SECTIONS ACROSS THE NILE VALLEY

A. 10 miles south of Maghagha. This section shows the maximum width of the cultivable strip of Upper Egypt.

B. 10 miles south of Edfu.

After Sir Henry Lyons' "Cadastral Survey of Egypt"

and to provide for existing needs when the flood falls below normal, is therefore imperative. Great dams like that at Aswan are very expensive, and must be carefully regulated to prevent infilling with silt. The Blue Nile is the great contributor of silt; its flood, when damming up the White Nile, is allowed to pass the barrage, and the reservoir is filled from the relatively clear water of the White Nile as its contribution passes along the river after the Blue Nile flood has begun to subside. The barrage is supplied with upper and lower sluices, the latter being kept open during the silt-carrying floods.

The existing works include the famous barrage at Aswan, with regulating dams at Isna, Asyut, and Zifta, as well as the Delta Barrage at the point of bifurcation just below Cairo. The regulating dams raise the level of the river and enable the canals to supply water to a greater area than

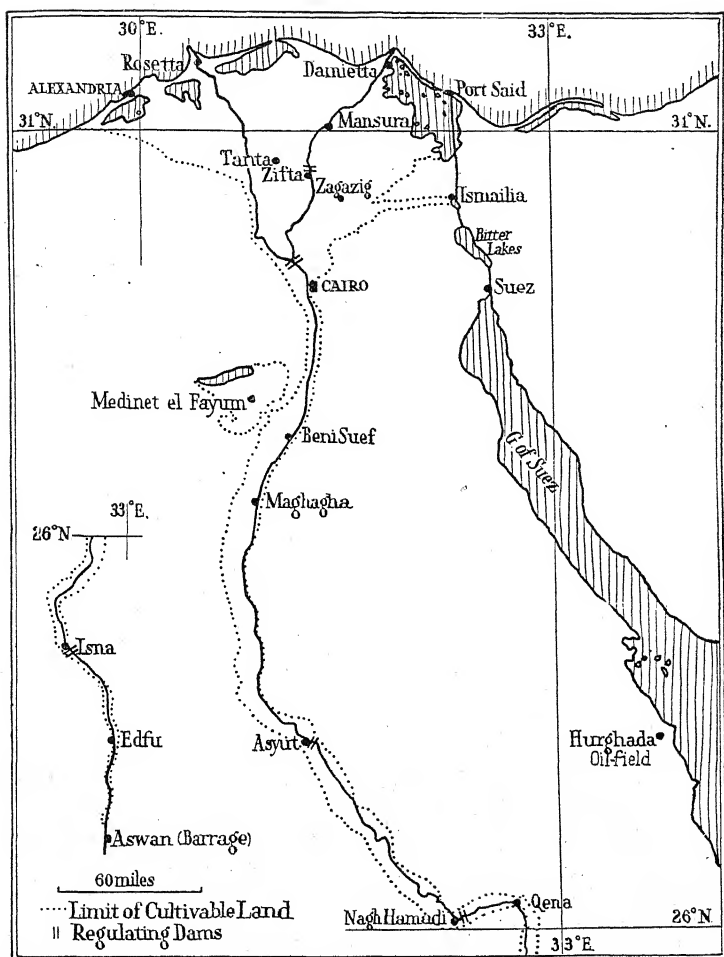


FIG. 45. THE LOWER NILE

The Nile clings to the right bank. A good deal of swamp remains in the Mediterranean littoral. The immense barrage at Aswan is for storage purposes. The position of the Hurghada oil-field is shown; its production is small.

Limit of cultivable land based on a map in Sir Henry Lyons' "Cadastral Survey of Egypt"

AFRICA

would otherwise be possible; the Asyut dam also regulates the supply of water to the Fayum. The Aswan barrage, which is $1\frac{1}{4}$ miles long, was opened in 1903. Its height was increased in 1912, and again in 1933, so that the level of the river is raised as far up as the Second Cataract, making a storage of 5000 million tons of water. The drop from the top of the dam to the water below is 120 feet, and

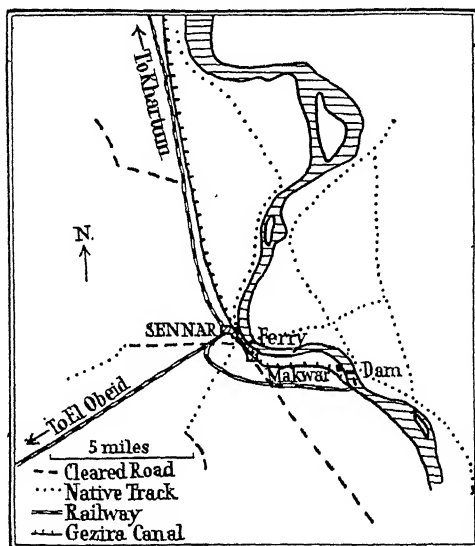


FIG. 46. THE SENNAR DAM

Note the take-off of the Gezira Canal just above the dam.

provision has been made for installing a modern power-station. The barrage at Nagh Hamadi was opened in 1930; it ensures the irrigation of certain districts in Upper Egypt.

The Sennar dam at Makwar on the Blue Nile was finished in 1925. It is designed to irrigate the Gezira plain, which lies in the angle made by the White and Blue Niles. At present some 800,000 acres are being irrigated. The extension of this area is contingent upon agreement with Egypt, for, clearly, unregulated control of the Blue Nile must have

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

serious effects upon cultivation in Egypt. It should be noted that Egypt is guaranteed the use of all the White Nile water.

An Anglo-Egyptian Agreement on the use and control of the Nile waters was signed in 1929, and further important developments have been discussed. A dam at Gebel Aulia, 30 miles south of Khartum, was completed in 1937. The impounded water is for the exclusive use of Egypt, and is sufficient to irrigate about half a million acres. An air survey of the sudd region has been made, and it is proposed to canalize the swamp for the conveyance of water stored behind a dam located on the Nile about 50 miles north of Lake Albert. A proposal has been considered to construct a dam at the exit of the Blue Nile (Abbai) from Lake Tana, where a natural basalt reef would simplify the work of raising the level of the lake.

Over 4,300,000 acres are perennially irrigated in Egypt, and about 1,000,000 have flood or basin irrigation; all the latter is in Upper Egypt. The total is over 70 per cent. of the cultivable land, the bulk of the remaining area being at present unreclaimed. Most of the area receiving flood or basin irrigation raises only one crop during the year; that with perennial irrigation raises two or three.

Perennial irrigation not only extends the area under crops, but allows of all-the-year-round cultivation. But although at first sight this is an enormous advantage, it seems to bring certain difficulties, the causes of which are not always clearly understood. Cotton cultivation illustrates this. It was found that while the acreage and production of cotton both increased with the development of perennial irrigation, the yield per acre progressively decreased.

AVERAGE YIELD OF COTTON PER ACRE IN EGYPT
FOR 5-YEAR PERIODS

1895-99	.	.	.	5.65 cantars ¹ of unginned cotton
1900-4	.	.	.	4.72 " " " "
1905-9	.	.	.	4.16 " " " "
1910-14	.	.	.	4.41 " " " "
1915-19	.	.	.	3.70 " " " "

¹ One cantar of unginned cotton is 315 lb.

AFRICA

Two chief reasons seem to have accounted for this decrease: (1) that the relatively stagnant irrigation water brings additional salt to the soil; (2) that the water-table is so near the surface in the irrigated land that cotton, a very deep rooted plant, has its root-development checked by not having sufficient room before the root-growth reaches the water-table.

The construction of a system of drains to ensure the lowering of the water-table seems to have checked the decline. The lowest yield per acre was 3.4 cantars in 1920; in 1925 the amount had, however, risen to 4.27 cantars, and in 1936 to 5.31 cantars.

Another effect of perennial irrigation is to decrease the supply of silt to the flooded land owing to deposition in the reservoirs and to the general checking of the flow of the flood-water. The importance of this is disputed; some investigators incline to the view that the fertilizing qualities of the silt, which is chiefly derived from the volcanic Abyssinian tableland, are not by any means so great as is generally assumed. It is, however, certain that perennial irrigation has necessitated the widespread use of fertilizers.

THE KINGDOM OF EGYPT (MISR)

The British protectorate over Egypt which existed during the Great War of 1914-18 was terminated early in 1922, and Egypt then became a sovereign state. The Anglo-Egyptian Treaty of Alliance of 1936 recognized the special British interest in the defence of the Suez Canal, and confirmed the operation of the Condominium Agreements of 1899 governing the administration of the Sudan. The country includes the Sinai peninsula and extends southward to parallel 22° N., thus covering about 383,000 square miles, mostly desert. Lower Egypt (the delta) and Upper Egypt (the Nile valley and the Fayum) together cover only 12,226 square miles—an area about twice the size of Yorkshire. Of this area nearly a quarter is water or marsh. Much of the latter is reclaimable. The population (1937) is 15,904,525 as against 12,750,000 in 1917, giving the enormous density on the settled land surface of more than 1200 to the square

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

mile.¹ Of the total 62 per cent. comprise the fellahin, many of whom are labourers working for the farmers; such labourers have in recent years been migrating in increasing numbers to the towns. It is significant of the minute

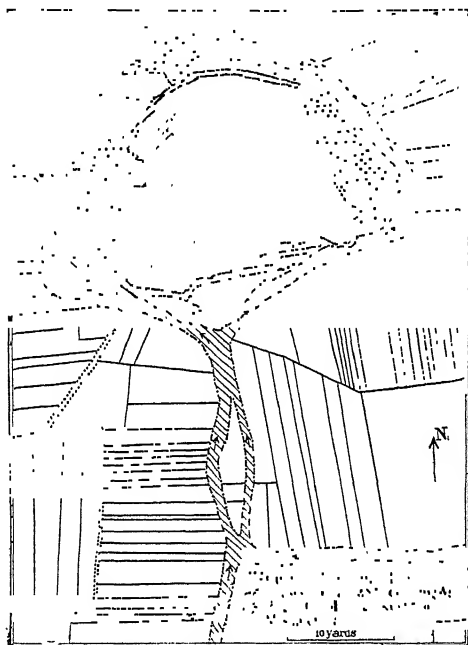


FIG. 47. SMALL VILLAGE OF LOWER EGYPT

This shows the general arrangement of the holdings. The holdings are normally very small, but each has access to water. Note that the roads run along the dykes of the main irrigation canal.

After Sir Henry Lyons' "Cadastral Survey of Egypt"

division of the land that nearly 70 per cent. of the land-holdings are under 1 acre, and that the bulk of the rest are under 5 acres. There are some 200,000 Europeans in the country, chiefly Greeks, Italians, British, and French, and some 40,000 nomadic Bedouin Arabs are found in the great area of Egypt beyond the tilled land.

¹ This figure would be substantially reduced to perhaps 700 or 800 to the square mile if the population of the larger towns were excluded.

AFRICA

Agriculture is necessarily the dominant occupation, as it has been from the earliest times. Careful, intensive husbandry with simple methods and implements is still general, but machinery is becoming increasingly common on the large estates. (For irrigation methods see p. 125 *et seq.*) Rotation of crops is practised, but the temptation of a high price for cotton may lead to its suspension, or at least modification—for example, a two-year instead of a three-year rotation. The fellah, also, may be too lavish in watering his crops now that perennial irrigation guarantees a supply. He often grows cotton on inferior ground. The wooden ox-drawn plough is still in common use, and at low Nile much land in Upper Egypt remains even to-day untilled, though the Nagh Hamadi barrage and the Gebel Aulia storage have brought more land under cultivation during the period of low water. Sun-dried bricks are the ordinary building material, and in the delta especially the fellahin are crowded into small villages, thus economizing valuable land. In times of high Nile they must be prepared to protect and mend the walls and embankments. The importation of manures (chiefly Chilean nitrates) is normally very large, and is primarily due to the raising of more than one crop on the land during the year. The Government does much to foster scientific farming. It pays particular attention to cotton, controls the distribution of seed, carries on research for the breeding of improved and new strains, and organizes campaigns against pests. It is encouraging the diversification of crops—owing to the economic danger of dependence upon one main commercial crop—and in particular is stimulating the cultivation of fruit and vegetables for the European market. The farming includes the rearing of oxen, buffalo, sheep, goats, donkeys, mules, and camels, while poultry have great importance (large quantities of eggs are exported). An important fodder crop is barseem (Egyptian clover); it yields four or five crops annually from one planting.

A threefold division of Egypt's crops can conveniently be made. In Upper Egypt autumn crops, chiefly maize, dura (millet), rice, and vegetables such as onions and tomatoes, are

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

grown on ground above the flood-level while the Nile is still high. In winter, although the northerly winds can be quite cool, there is quite enough warmth to grow wheat, barley, pulses, clover, and flax upon the ground from which the flood has receded. Summer crops requiring sub-tropical or tropical heat and perennial irrigation, especially cotton, are chiefly produced in the delta. This crop—Egypt's great cash crop—normally covers nearly one-third of the cultivated area, and more than two-thirds of the people are dependent on it. Another delta crop is rice, and in Upper Egypt sugar is specially important. Large quantities of dates are grown both by the Nile and at the oases.

Cotton, wheat, and maize occupy between them the bulk of the cultivated acreage of Egypt, and so dominating is cotton that considerable quantities of foodstuffs, chiefly wheat flour, have to be imported. For this reason the Egyptian Government restricts the area under cotton.

The Fayum oasis may be regarded as an outlying part of the Egyptian irrigated lands. It lies below sea-level; the ancient Bahr Yusuf brings water to it. It is very carefully cultivated. In the Libyan Desert there are several important oases—Siwa, Dakhla, Kharga—situated in depressions where underground water is reached. The food-crops of Egypt proper are also found here, and light railways to the main highway permit of the export of dates.

Cotton. Commercial cultivation of cotton began rather more than a hundred years ago, and received a considerable fillip during the American Civil War. Egyptian cotton generally is of fine quality—long staple, fine lustre, silky, and strong—and second only to sea-island cotton. Moreover, the average yield per acre (about 400 lb. of ginned cotton) is twice that of United States rain-grown cotton. In Egypt many varieties have been, and are still, grown. Upper Egypt principally grows a variety—Ashmouni—yielding a brownish-coloured fibre, and this remains the dominant variety cultivated. At one time Sakellaridis (Sakel), cultivated chiefly in the delta, was outstanding; but its fine quality seems to have deteriorated, and in recent years it has fallen out of favour, and two others—

AFRICA

Zagora and Giza 7—have attained prominence. A pest known as the pink boll-worm first appeared in 1912; it annually destroys a substantial percentage of the crop.

Mineral Resources. Egypt's mineral wealth is limited. There is much building-stone, phosphates are worked at Kosseir and other places, about 450,000 tons being produced annually, and in the Sinai peninsula manganese ore is mined for export to the United Kingdom and Germany. Drilling for oil is still being carried on in the coastal region south of Suez, on adjacent islands, and in the western part of the Sinai peninsula. The Hurghada field at present produces most of the annual output of about 180,000 tons of crude petroleum; this is refined at Suez.

Industries and Towns. Apart from the arts and crafts that are indigenous to Egypt, industries are not at present very important. A good deal of spinning and weaving of mostly lower grades of cotton is carried on—for example, at Alexandria and Cairo—and of course numerous ginneries exist. A beginning has been made with the manufacture of other textiles—wool, silk, and flax. Imported and local sugar is refined, and there is some export of this product. This and cigarette-making, using imported tobacco from Greece, Bulgaria, and Turkey, are two considerable industries. Cotton-seed oil and cake and soap are also manufactured, and sewage is turned into artificial manure. It is noteworthy that the bulk of the railway rolling-stock is made in State railway-workshops. Alexandria and Port Said do some shipbuilding and ship-repairs. A point of increasing importance to Egypt is the large number of tourists who visit the country, not only because of its extraordinary historical and archæological interest, but on account of its excellent winter climate. Catering for these tourists may be regarded as a minor but not unimportant industry.

Two towns deserve special analysis. The shape of cultivated Egypt allows of only one great market and Government centre—Cairo; and the delta allows only one great port—Alexandria.

Cairo (with a population of 1,307,000) stands where the narrow strip of Upper Egypt meets the broad delta, in an

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

obvious position not only for a centre of trade, but also for the government of the two areas. It is built on a spur of the Mokattam Hills, at a point where the Nile passes at the foot, and both water and land roads between delta and valley must pass it. Here, too, was the lowest crossing-place of the Nile. Caravan routes from Asia converge upon it, and of course to-day its nodality is emphasized by railways. It is essentially a market, commercial, and capital city, with a number of well-established craft industries.

Alexandria (682,000 inhabitants) is the site from which the ancient Greeks for a time controlled Egypt and tapped the Far Eastern trade. A delta is not usually convenient for shipping, and in this

case the eastern part is less useful than the western, because currents from west to east sweep the silt eastward. A long island strip off the western part of the delta, with salt marsh on the landward side, provided Alexander the Great with a base accessible at once from the sea and from the delta, and therefore from the valley. This island is now joined to the mainland, and to deal with modern shipping an artificial harbour has been constructed. Railway^s link it with all parts of the delta and a ship canal with Rosetta, while the Mahmudieh Canal connects it with Cairo. It is specially interested in the cotton and sugar industries, and thoroughly dominates the import and export trade of Egypt. The registered tonnage of ships using

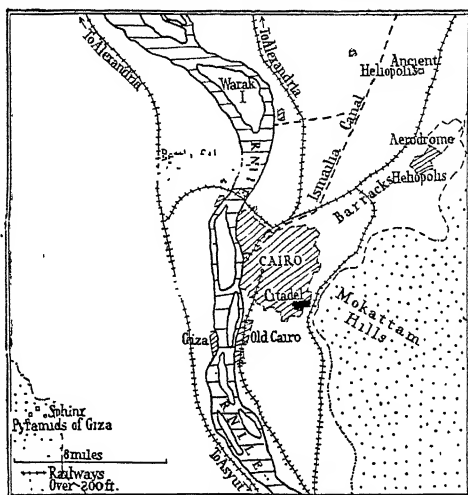


FIG. 48. THE POSITION OF CAIRO
Delta routes for Upper Egypt converge on Cairo, situated on a spur of the Mokattam Hills.

AFRICA

Alexandria is about 6 million tons annually, and the port handles 80 per cent. of the import and more than 90 per cent. of the export trade (in value). As a Mediterranean port it is now surpassed only by Genoa and Marseilles. It is also an important air junction for English and Dutch lines serving the East and the route to the Cape.

Rosetta and Damietta particularly serve the water-routes at the ends of which they are situated, but do not possess facilities for large shipping, as they are badly silted.

Aswan is the most important city in Upper Egypt. It has large granite quarries, and, like Luxor, is a winter resort visited by many tourists. Near the latter place are the famous ruins of Thebes. The filling of the Aswan reservoir drowns the Temple of Philæ.

The important oases of Kharga, Dakhla, and Siwa lie on an old caravan route to Benghazi in Cyrenaica, on the border of which Egypt now possesses the small port of Sollum. Farther south, and adjacent to this border, are some little-known oases—notably Owanet—inhabited by the fanatical Senussi sect. It was at Owanet that remarkable rock-drawings of giraffes (about which the settled Berber inhabitants had no traditions) were discovered in 1923. Giraffes being unknown in this area to-day, these drawings, as well as local traditions of extensive grazing-grounds here on the Sudan border, may be taken as evidence of progressive desiccation.

The *communications* of Egypt are relatively simple. The Nile provides a continuous waterway, available not only for the dahabeeyah (the picturesque native craft), but also for shallow-draught steamers, regular services of which ply on the river and maintain connexion with the Sudan. The dam at Aswan is avoided by a canal with locks.

The main railways (State-owned) are of standard gauge. The chief line connects Alexandria with Cairo, and runs up the Nile to Shellal, just above the First Cataract. Difficult country and political considerations have so far prevented this main line from being linked with the Sudan railway-system. These State railways, including the 2' 5½" gauge lines to the western oases, total about 2500 miles, besides which there are nearly 900 miles of privately owned light

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

railways, mainly in the delta, and serving the needs of agriculture. The main railway-system is connected with the Palestine railways, crossing the Suez Canal at El Kantara.

Camel transport naturally obtains over the desert area.

The Suez Canal. Eight centuries B.C. Necho constructed a canal between the Nile and the Gulf of Suez ; and this was rebuilt on several later occasions. The Venetians investi-

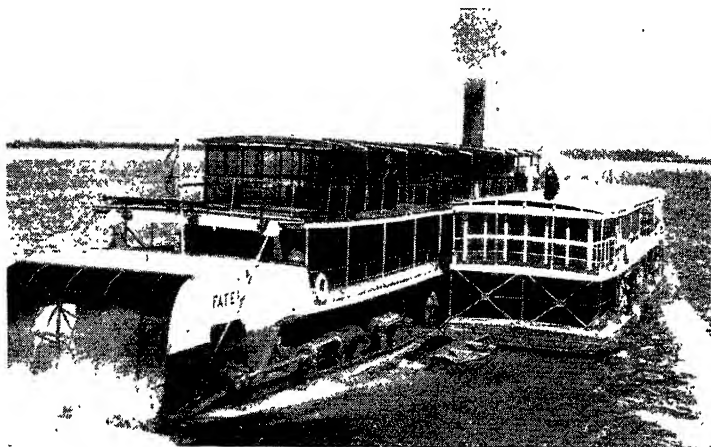


FIG. 49. RIVER TRANSPORT IN THE ANGLO-EGYPTIAN SUDAN

Stern-wheelers are commonly used for river transport in Africa.

Sudan Government

gated the possibilities of a canal from the Mediterranean to the Gulf of Suez when they found that the use of the Cape route affected their trade. Before the present canal was opened in 1869 there was organized camel transport across the isthmus, and the need for a canal to obviate the use of two shipping terminals was urgent.

Although some of Egypt's commerce passes through Port Said and Suez, especially the former, the importance of the canal is primarily as an ocean link. In comparison with the Cape route it saves about 4000 miles on the way from Western Europe to India, though the saving for the Far East and Australia is considerably less. For Mediterranean countries

AFRICA

the saving is greater, and much of the modern importance of such ports as Marseilles, Genoa, and Venice is derived from the use of the Suez Canal.

There are no locks on the canal. It passes through the Bitter Lakes, which occupy the old head of the Gulf of Suez and serve to neutralize the slightly higher level of the Red Sea. It now has a minimum width of 195 feet at a depth of 33 feet, and along nearly all its 103 miles of length there is enough room for two vessels to pass. The average time of the passage is now about 13 hours; the speed is limited to 10 knots in order to preserve the banks. Dues are collected at Port Said; these are roughly equivalent to the running of a vessel for a week, so that the saving of time effected by using the canal and the nature of the cargo carried are important factors determining its use. Though the British Government holds 44 per cent. of the share capital, a French company is actually responsible for the canal. The British Government's view of its strategic importance and the need for its adequate defence was recognized in the Treaty of Alliance of 1936.

Despite the fact that the Panama Canal provides an alternative route of no greater length from North-west Europe to certain Far Eastern and Australasian ports, the tonnage using the Suez Canal shows no diminution on the figures of the years preceding the opening of the former canal, as the following table shows:

YEAR	NET TONNAGE OF COMMERCIAL SHIPPING PASSING THROUGH THE SUEZ CANAL	
1913 . .	5085 ships	20,035,000 tons
1938 . .	6171 ships	34,418,000 tons

The "Suez Canal net tonnage" given above is a considerably higher figure than the registered tonnage that is commonly used for British shipping statistics. For toll purposes a special method of assessing tonnage is used.

In 1938 50.5 per cent. of the tonnage passing through the canal was British, Italian tonnage being next in order, with

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

13.5 per cent. of the total. These were followed in order by German, Dutch, French, and Norwegian shipping. A feature of recent years has been the great increase in Italian shipping, connected with East African developments. In addition, considerable use was made of the canal for naval and military purposes.

Port Said (population, 127,000) is a coaling-station of great importance, deriving its coal from the United Kingdom. Only a small amount of British coal is exported past the Suez Canal. The port has a considerable *entrepôt* trade, besides sharing with Suez that part of the general sea-borne import and export trade which does not pass through Alexandria.

Port Fuad is a port that has grown up opposite to Port Said; it possesses important engineering and repair workshops. Suez refines Egyptian as well as imported oil, and is being developed as a port for the supply of oil to vessels using this fuel. Both Port Said and Suez are connected with the railway-system of Egypt through the junction of Ismailia. The provision of the Sweet Water Canal was a condition attaching to the original concession for the Ship Canal; the concession expires in 1968.

Trade of Egypt. The following figures exclude the value of what is normally a substantial re-export and transit trade, as well as that of the trade—not very large—with the Anglo-Egyptian Sudan.

—	1936	1937	1938
Imports (£1000) .	30,635	37,167	36,027
Exports (£1000) .	32,980	39,760	28,587

The value of the export of raw cotton (a small but increasing amount is manufactured locally) has in recent years been about 75 per cent. of the total value of the domestic exports, but both the quantity and the value show substantial fluctuations. The value of the raw cotton exported in 1938 was £21,200,000, a great reduction on that of 1937. The demand for and the price of cotton

AFRICA

determines whether the trade balance will be favourable or otherwise. In 1938 cotton-seed, seed-oil, and oil-cake were exported to the value of nearly £2 $\frac{3}{4}$ millions, showing further dependence upon cotton. Onions (£900,000) came next, followed by rice, oil, phosphates, hides and skins, cigarettes, and sugar (£150,000). The United Kingdom took nearly a third of the cotton. France is usually the second-best customer for cotton, while Germany (including the former Czecho-Slovakia), Italy, India, Japan, Switzerland, Rumania, and the United States are also considerable buyers.

Of the imports in 1938 cotton goods (heavily declined) were valued at £3 millions, followed by fertilizers, iron and steel goods, machinery, coal, oil, motor-cars and accessories, timber, silk and woollen textiles, tea, tobacco, and coffee.

The United Kingdom normally takes about 40 per cent. of the exports, chiefly raw cotton, but also cotton-seed, cotton-seed cake, onions, and eggs, and sends 25 per cent. of the imports, including most of the fine cotton goods, coal, and machinery. Italy and Japan send most of the coarse qualities of cotton textiles, and India sends cotton yarn. France, Germany, Italy, and the United States all have a considerable share in Egypt's trade.

The trade with the Sudan, totalling nearly £2,000,000, involves the import of animals, sesame, dates, ground-nuts, and dura, and the export of textiles, cereals, tobacco, sugar, and oil. Exports generally substantially exceed imports, as the Sudan's surplus of the imported products mentioned is not very large. This trade is through Wadi Halfa and Suez.

THE ANGLO-EGYPTIAN SUDAN

The Sudan includes a long stretch of the Nile from Nimule (4° N.) to Wadi Halfa (22° N.), all the drainage from the Congo divide, part of the upper drainage of Lake Chad in the Dar Fur Province, a large part of the Libyan Desert, the lower courses of all the Abyssinian tributaries, as well as the deltas of the Gash and Baraka rivers, which run from the northern fringe of Abyssinia. Its coral-fringed coast-

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

line is on the Red Sea, a desert belt which is nevertheless of vital importance.

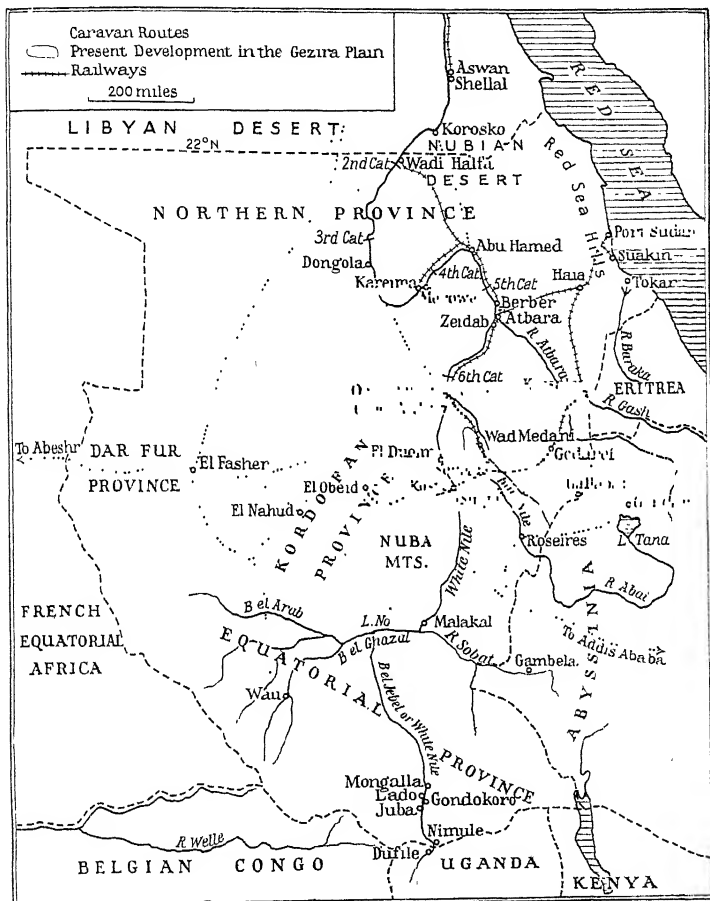


FIG. 50. THE ANGLO-EGYPTIAN SUDAN

The importance of Port Sudan in relation to railway development should be noted. Some of the districts mentioned in the text are indicated.

For administrative purposes the country is now divided into eight provinces, some of the older provinces having

AFRICA

been amalgamated. The total area is just under a million square miles, and includes a population estimated in 1938 at about 6,350,000. The population is rapidly increasing since the suppression of the Mahdi despotism and the devastating slave-trade with Arabia that preceded it. So little is known of the population of the Equatoria Province and other areas that it is probable that the total is considerably in excess of the figure given. The population is very mixed, including Arabs in the north, negroes in the south, and mixed races in the middle zone; further, it is very unevenly distributed, owing to a rainfall varying from nothing in the north to a considerable amount in the south and to other variations in natural conditions. Thus the arid Northern Province has a population density below one to the square mile, while in the Equatoria Province it rises to about sixteen.

Vegetation and Productions. North of the latitude of El Fasher the vegetation covering is negligible. Dates are a cash crop in this belt, there being some export to Egypt from the districts by the Nile. South of this there is the belt important for gum arabic, and as the rainfall increases the dry region merges into cattle-producing savanna-lands, leading on to the forests of the south. The wooded lands are the source of fuel, and much charcoal-burning is carried on, while wild coffee occurs in the extreme south. The main food-crop is dura (millet), while cotton, which may suffer from cold weather in the irrigated districts to the north, can be grown as a 'winter' crop in the rainy districts of the south. There is a limited amount of basin irrigation by the Nile toward the Egyptian frontier.

Native agriculture is generally primitive, and among many of the negro tribes it is customary to leave agricultural work to the women. Every effort is being made to improve native cultivation, and there appears to be no lack of adequate labour in connexion with the big irrigation scheme that is such an important modern development. The chief dura-growing area lies south of a line joining Khartum with Kassala, and the extraordinary variations in the total crop are revealed in the table on p. 143, which shows the yield in selected years in the chief dura-producing areas.

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

As the cost and supply of labour are largely determined by the supply of dura, its production is a matter of Government concern, for the increase in the production of both rain-grown and irrigation cotton would, unless appropriate measures were taken, lead to a neglect of the cultivation of the staple food. Some dura is grown in basins along the

DURA CROP (THOUSANDS OF TONS)			
1920	1921	1937	1938
156	511	363	283

White Nile. Dura also provides the native beer, and the dura-stalks are fed to animals. The crop is almost entirely produced for home consumption, but in good years there is some export, notably to Egypt and Italian East Africa.

Gum arabic held the leading position among the products of the region until 1924, when cotton took first place in export values. The Sudan produces about 70 per cent. of the world's supply of gum arabic, which is used principally in medicine, in confectionery, and in textile manufactures to give lustre and finish to cloth. The trees (varieties of acacia) are tapped for their liquid. Lumps of gum harden on the branches; these are collected, and exposed for weeks to the sun till they are nearly white. Indiscriminate tapping and strong demand in recent years have led to picking being carried out over wider and wider areas. The Government is now issuing seed. Kordofan is the chief producing province, the gum being auctioned at El Obeid, El Nahud, and other centres. The United Kingdom, the United States, France, and Germany are the chief customers for gum, the value of the export of which in 1938 was £660,000.

Cotton. Cotton has become so dominant a crop as to constitute a danger, for the prosperity of the country has become dependent on variations in the production and in the price it commands. It is grown on rain-land, on flood-land, and on land watered by perennial irrigation. American 'middlings'—*i.e.*, American varieties, of medium staple—

AFRICA

are grown in the rain areas, chiefly in the Blue Nile Province, and South Kordofan, and in districts watered by pumping

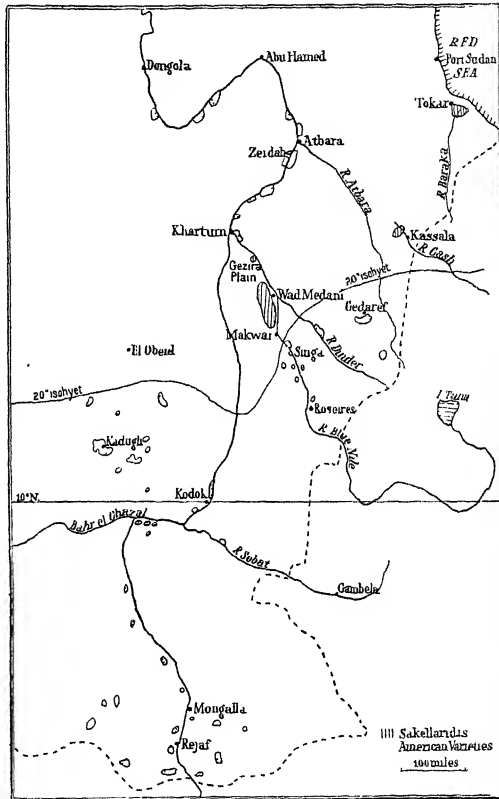


FIG. 51. COTTON AREAS IN THE SUDAN

Most of the American cotton is grown in the region with more than 20 inches of rain; the rest is chiefly by pumping schemes along the Nile. The districts growing Sakellaridis are more important in the Sudan. The areas available for

Based on a map of the Empire Cotton Growing Corporation

schemes—for example, at Zeidab, just south of Atbara. The Government has interested itself not only in distributing seed, but in pumping schemes. But now Sakel-type cotton

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

forms the greater proportion of the crop. This irrigation cotton has been grown for a considerable time in the deltas of the Gash and Baraka rivers (at Kassala and Tokar), but the crop in these districts varies with the amount of flood-water. The Sennar dam already permits a considerable production in the Gezira plain, and although the present agreement with Egypt allows irrigation on only a limited area, it is hoped that the Gezira triangle will



FIG. 52. IRRIGATION COTTON IN THE GEZIRA—SECOND WATERING

The irrigation channels are filled only at intervals during the growing period.
Sudan Government

eventually have 3 million acres irrigated and an annual output of a quarter of a million tons of cotton. However, this concentration on a cash crop may be limited by the economic danger, for it is essential to associate cotton-growing with the production of subsistence crops. Almost the whole of the export of lint until 1931 went to the United Kingdom, but in recent years additional markets have been secured, notably India. An adequate supply of labour seems assured; some is recruited from the pilgrims who pass through the Sudan to or from Mecca. There are now some 25,000 tenants in the Gezira irrigation area, and the average holding is 30 acres per family; the work of these cultivators is carefully supervised, and a four-year rotation

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

Northern Province are exported to Egypt, and a trifling amount of ivory from the south is sent to London. Rubber-trees occur toward the Congo divide, but there is no significant collection. The mineral wealth includes salt, of which there is a large output near Port Sudan, and a little gold, worked at Gabait, in the Red Sea Hills.

Towns and Communications. The Anglo-Egyptian Sudan



FIG. 54. SCENE IN OMDURMAN

Omdurman is a big native market.

Sudan Government

has now 2000 miles of railway, while Government steamers ply on all navigable sections of the Nile and its tributaries; the total length of the motor-roads is rapidly increasing. As there is no through connexion by rail with Egypt, railway goods traffic concentrates upon Port Sudan.

Khartum, with Khartum North, has some 70,000 inhabitants; it is situated at the junction of the Blue and White Niles, between the two rivers, and commands a great deal of river-traffic, as well as the Nile valley railway. Recent developments in the Gezira have increased its importance,

AFRICA

and besides being the administrative centre it is an important centre of education and of agricultural research. It is now connected by an imposing road and tram-bridge with Omdurman, the large Dervish market-town of some 110,000 inhabitants which sprawls for seven miles along the White Nile opposite Khartum. Omdurman is largely a mud-built town, and is a centre for many native crafts. South of Khartum the railway goes up the Blue Nile to Sennar, and then turns westward to reach El Obeid, an important market centre in Kordofan for gum, dura, sheep, and cattle. North of Khartum the railway cuts across the great bend of the Nile marked by the caravan terminus of Dongola to Wadi Halfa, an important frontier-station, through which passes a little of the export trade and a good deal of the import trade. Just south of Berber the railway sends off at Atbara the important branch leading to Suakin, the old Arab slave-port, and to Port Sudan. Suakin has a tortuous entrance through a coral reef, but Port Sudan, some 30 miles to the north, has a convenient opening, and is now a modern port with proper shipping facilities; it now deals with some 4 million tons of shipping annually, and is regularly visited by a large number of shipping lines. Nearly 90 per cent. of the total trade (in value) passes through this port.

At Haia this Red Sea line sends a branch southward to Kassala, in the cotton-growing Gash delta. The extension of this line to Gedaref and Sennar assists a fertile area.

Some hundred landing-grounds for aircraft have been cleared; the air-mail route to the Cape passes through the Sudan, as does the route to the former Italian East Africa, and Khartum has not only regular mail and passenger connexions with the principal towns of the Nile valley, but a regular service to Lagos *via* El Geneina and Kano.

Government steamers ply between Sennar and Roseires and southward from Khartum to Juba, from which point a motor-road runs to the frontier-station of Nimule, and beyond, through Uganda, into Kenya Colony. There is navigation from Nimule to Lake Albert. The Bahr el Ghazal is navigable up to Wau and the Sobat up to Gambela, a trading station some distance inside the Abyssinian frontier.

EGYPT AND THE ANGLO-EGYPTIAN SUDAN

There is still considerable dependence upon camel and donkey transport in the north and human transport in the south. The isolated Dar Fur Province is arid in the north, but has cattle-pastures in the south. Millet, sesame, and cotton are the chief crops, and El Fasher is the largest centre.

Trade. The export figures in the following table exclude the re-export and transit trade:

—	1923	1937	1938
Imports (£1000) .	4,670	6,285	6,280
Exports (£1000) .	2,560	8,130	5,490

The United Kingdom sends normally a quarter to a third of the imports, followed fairly closely by Egypt and Japan. The United Kingdom usually takes the largest share of the cotton crop and all the cotton seed. There is a substantial re-export and transit trade, including a declining amount with Abyssinia; it totalled £600,000 in 1938. The trade with Egypt has been referred to on p. 140.

The figures for 1923 are given to illustrate a typical year before the expansion of cotton-growing. Both the yield and price of cotton fluctuate considerably, and, although in 1938 the cotton export was 62,000 tons, as compared with 70,000 tons in 1937 (the peak year), the value fell to £3.4 million from £5.4 million. Most other exports showed a decline on the 1937 figures. Cotton and cotton seed provided 67 per cent. of the total export values in 1938, as compared with 73 per cent. in 1937. In 1938 gum was second to cotton at £660,000, followed by millet, sesame, and hides and skins (£100,000). All other items provided only 10 per cent. of the total. In 1938 cotton piece goods, the leading import, were valued at £1.16 million, and were mainly cheap Japanese products. Other imports of note were sugar (£630,000), tea from Java, and coffee from Abyssinia, together with motor vehicles, coal and coke, metals and machinery, timber, flour (from Australia), and oil.

CHAPTER V

THE EASTERN HORN

GENERAL CONSIDERATIONS

THIS economic region comprises the political divisions of French and British Somaliland and the former provinces of Italian East Africa, which included Abyssinia, again independent. It is a relatively small area, by no means uniform in physical character, but, with every allowance for areas that are either too arid or too elevated for exploitation, it has as yet experienced comparatively little development in the modern sense, so that the total trade is very small.

Physical Features. The region groups itself round 10° N., stretching from the equator to 17° N. Physically it is part of the Archæan plateau of Africa, cut through by the Rift Valley from the Strait of Bab el Mandeb to Lake Rudolf. On both flanks of this Rift Valley prolonged volcanic activity has spread vast sheets of lava, piled up into elevations that often exceed 10,000 feet, and reach over 15,000 feet in Ras Dashan, which, with other peaks, is snow-capped. The coastal region is generally low, except for the faulted block of British Somaliland, of ancient crystalline formation, which projects toward Cape Guardafui, forming an eastward continuation of the Abyssinian Highlands, though at a considerably lower level.

The Abyssinian plateau is dissected by numerous rivers, especially on the west and south—rivers whose torrential character has led to the cutting of deep gorges, some of those on the west approaching a mile in depth. The sides of these gorges often show the typical development of basaltic columns. The rugged nature of these highlands is unlike most mountain areas in Africa. The rivers have summer

THE EASTERN HORN

floods from monsoon rain. The most important is the Blue Nile, which takes its rise in Lake Tana, 1200 square miles in area, at a level of nearly 6000 feet, and occupying a broad depression in the heart of the plateau. In the north of this plateau rise the Atbara and the Baraka. The Rift Valley is marked by an inland drainage system including Lakes Abaya, Stephanie, and Rudolf, as well as by the Hawash river, which fails to reach the Gulf of Aden. No permanent stream finds its way either to the Red Sea or the Gulf. In the south-east the Juba and the Webi Shebeli combine to form a deltaic area on the coast near the equator.

Climate and Vegetation. The highland character of much of the area not only results in a lower temperature than the latitudes would suggest, but exercises a dominant influence upon the rainfall. In spite of a high altitude of the sun throughout the year, night frosts may be expected everywhere above 6000 feet, and there is some winter snowfall on the highest parts. The figures in the following table contrast the plateau with the Red Sea coast:

TOWN	ALTITUDE	HOTTEST MONTH	COOLEST MONTH	ANNUAL RANGE
Addis Ababa.	8005 feet	65.5° F.	58.5° F.	7° F.
Massawa .	64 feet	94.5° F.	78° F.	16.5° F.

The mean annual temperature at Massawa is 86° F., which is almost the highest in the world. This is typical of the Red Sea and Gulf of Aden coasts. The coast of Italian Somaliland is somewhat less hot, as the Indian Ocean has a more modifying effect than the enclosed Red Sea.

The highland stands athwart the south-west monsoon, arising from the Saharan-Asiatic low-pressure belt; the west and south-west sides naturally receive a heavy summer rain, which, falling in a relatively short period, leads to the flooding of the Nile. The heaviest rainfall is probably nearly 80", and is found in the south-west; it decreases toward the north and east, Gondar receiving about 40" and Addis

AFRICA

Ababa nearly 50".¹ In the rain-shadow to the east, where excessive heat prevails in summer, the amount of rain is negligible. Such rain as is received here comes chiefly in the cool season of the year and is brought by north-east winds, which also cause a slight precipitation on the plateau. Massawa's total is 7½" and that of Berbera 2½".

The Danakil lowland and the coast-lands are arid and barren, but with increasing rainfall toward the higher ground behind the country gradually improves, passing through scrub-land with drought-resisting, gum-producing plants and a certain growth of tall, tufty grass into something like savanna conditions. About 6000 feet forests of box and juniper are common. The less elevated parts of the plateau itself are to a great extent well wooded. The deep lower western and southern valleys have forests of the tropical type, in which coffee- and rubber-trees flourish; above these are forests of a more temperate character, with wild figs and olives, junipers, and yews. At the higher levels trees are generally absent, and the conditions of a temperate grass-land type of vegetation prevail. Above about 12,000 feet the plateau is barren. The animal life is equally varied. At the lower elevations, in the swamps and streams, the rhinoceros and hippopotamus are met with, the latter even being found in Lake Tana. The lion and leopard, as well as the zebra, antelope, and hartebeest, occur on the plateau and the lower lands to the east, while domestic animals are naturally common throughout the region.

Development. The backward development of this economic region chiefly arises, either directly or indirectly, out of the physical conditions. It has suffered for centuries from religious, tribal, and other wars, and to this also must be attributed a good deal of the present under-development. Aridity along the coast and the inaccessibility of the interior are obvious drawbacks. The existence of the extraordinary 'Christian' island of Abyssinia in a sea of

¹ Addis Ababa has two maxima—typical of the plateau—a slight one in April and a considerable one in August. The cause of the early rains is not clearly understood, but it seems certain that the heavy summer rains (23" in July and August) are associated with a strong south-westerly air current. Reliable observations in this region are few.

THE EASTERN HORN

Mohammedanism is to be attributed to physical isolation. The sharp division of the highland from the lowland has led to a strong development of nationality, which, however, eventually succumbed to Italian encroachment. Suspicion of strangers, an effective feudalism, and a general absence of interest in anything beyond the borders of the country were combined with the difficulty of co-ordinating the government of a highland area almost devoid of effective means of communication, so that Abyssinia was almost beyond the reach of Western influence. Despite the French railway from Jibuti to Addis Ababa, completed in 1917, and such an innovation as an occasional modern reaper and binder, Abyssinia lived largely for itself. There was little incentive to produce for export, and primitive agricultural methods prevailed. The wants of the people were simple, there was little demand for foreign goods, and internal trade was largely a matter of barter. There was a large variety of products, both animal and vegetable, but any mineral wealth that existed had not been exploited.

Such were the general conditions prevailing in the main mass of the Abyssinian Highlands at the time of the Italian conquest in 1936. Italy already had extensive territories in Eritrea, which included the extreme north of the highland mass, and in Somaliland, the rest of which was shared by France and Britain. These lands are generally arid and susceptible of only limited economic development. Something has been done to induce the inhabitants, who are principally nomads, to adopt a sedentary life, and, with the aid of irrigation, to settle colonists in the Italian areas. Italy pursued a vigorous development policy for all her territories, a policy involving in the first place an improvement in the communications.

FORMER ITALIAN EAST AFRICA

An Italian decree of 1936 established the colony of Italian East Africa, consisting of five provinces, with the territory round the capital, Addis Ababa, as a separate administrative unit. These divisions are shown in Fig. 55A. In carrying out this reorganization, the boundaries of

AFRICA

Eritrea were extended to include the old Abyssinian province of Tigre, a mainly highland area, and the Danakil lowland, while to Italian Somaliland was added the adjacent large district of Ogaden. To a large extent the basis of the new divisions was ethnic and linguistic; the official languages of



FIG. 55. THE ABYSSINIAN AREA

Rivers radiate from the / This map shows
the boundary of Abyssini changes made
by Italy and shown in Fig. 55A.

Eritrea became the Tigre tongue and Arabic, the official language of Amhara and of the governorship of Addis Ababa, Amharic, and that of Harar and Galla and Sidamo, Arabic. The total area is about 650,000 square miles, and the population is estimated to be about 12,000,000. The provinces of Eritrea and Somaliland covered well over half the total area, but carried less than one-quarter of the total population, and the remaining provinces—Amhara, Harar, and Galla and Sidamo—were, therefore, better populated.

THE EASTERN HORN

These latter provinces comprised the essential part of Abyssinia and the greater part of the Abyssinian Highlands, but in view of the restoration of Ethiopia's independence, it will be convenient to consider that country within its old boundaries (see Fig. 55), which included the higher Tigre area in the north and lower lands in the east and south.

Abyssinia (Ethiopia)

Called Ethiopia by the Abyssinians, this ancient empire covers an area (see Fig. 55) of about 350,000 square miles, with a population estimated at 8,000,000. It is a region of bold physique and diverse peoples. The Abyssinians proper number barely one-half of the population; they profess a monophysite form of Christianity derived from the Coptic Church of Egypt. The Church is a dominant factor in the life of the people; it owns about a third of the land, and an extraordinarily high proportion of the adult male population is incorporated in the ecclesiastical organization. The Abyssinians proper are found in the districts of Tigre, Shoa, Amhara, and Gojam—*i.e.*, in the most elevated areas. The Abyssinians¹ are of Hamitic origin, with both Semitic and negro admixture. The non-Abyssinian population includes Hamitic Gallas, mostly Mohammedan, in the south-east, Somali tribes in the east, and negro tribes in the south-west. There is a small group known as the Falashas, of Jewish faith, and providing the principal workers in iron in the country. Besides these there is a small trading population of Jews, Arabs, Armenians, Indians, and Europeans. Under the old *régime* the prevalence of ill-paid soldiery and a strong feudalism hindered progress; a governor could command the services of numerous labourers at practically no cost to himself, while slavery, though being slowly suppressed, was prevalent. The Italian Government decreed the abolition of slavery, abolished the feudal armies of the Rases (local lords), and did not seriously interfere with the customs of the native people, who, however, were subjects, not citizens.

¹ The name is derived from a word, *abeshu*, meaning 'mixed.'

AFRICA

Productions. Most of the people live at an elevation above 5000 feet, except in the drier east, because the deep valleys of the south and west are swampy and unhealthy, besides being forested. Rivers are not arteries of communication in Abyssinia—they are obstacles—and good bridges are rare. Three zones are distinguished according to elevation:

(1) The Kolla, up to 5000 feet, chiefly in deep valleys, where bamboo, rubber, and coffee are found.

(2) The Voïna Dega, or "wine highland," 5000 to 8000 feet, marked by a good deal of warm temperate forest and cultivation.

(3) The Dega, or highland, chiefly open, grass-covered plateau country and allowing temperate cereal cultivation to about 12,000 feet. This is largely pastoral.

The rich soil of the valley bottoms of the Kolla grows some cotton, rice, and sugar-cane, and a small amount of rubber is collected. In the south and south-west are extensive forests of wild coffee, besides which there is an increasing cultivation of the long-berry Mocha variety in the south-east, especially in the Harar district. In some districts the date-palm is cultivated, and cattle and camels are common in the drier east. The Voïna Dega is characterized by the production of the vine, olive, tobacco, and cereals and the rearing of cattle, sheep, horses, donkeys, and mules. In the Dega cattle and sheep are numerous, and horses are bred, especially in the region north-west of Addis Ababa. Dura is grown at the lower levels; wheat and barley are common (the latter being carried to the upper limit of cultivation, about 12,000 feet); and pulses are important. At the lower elevations two and even three crops can be raised in the year.

The hay crop is an important element in the pastoral economy, and the cutting is initiated each year by the local lord with great ceremony. Small hand-sickles are used in the process. The highland pasture is excellent for the ordinary domestic animals. Brushwood is the normal fuel, but there is a serious deficiency on the plateau. There is believed to be an abundance of mineral wealth, including coal, iron, gold, copper, sulphur, and potash. Iron is worked

THE EASTERN HORN

for native requirements, and some alluvial gold is found in the western valleys. Manufacturing industries are practically non-existent.

Towns and Communications. The farming is primitive, and the people live in villages composed of cone-shaped thatched huts with neither chimney nor window. The towns are only villages. The position of the capital varied in earlier times, but became fixed at Addis Ababa (about 150,000 population), owing to the planting and conservation of woods of eucalyptus to provide fuel. The Government of Shoa, which contains the capital, has a population of 1,850,000. Means of communication are principally the ox-wagon and mule transport. The chief highway, apart from the new road system that will be referred to later, is the single-line, metre-gauge railway, 386 miles long, from Jibuti through Dire Dawa (30,000 inhabitants) to Addis Ababa. This line was difficult to construct, and is difficult to maintain, as unruly Danakils find the track a useful source of iron and timber. Trains run twice weekly, and only in daylight. Harar (25,000 inhabitants) is an old walled city and an important trading-centre on a fertile upland famous for its coffee. Gondar (22,000 inhabitants), the ecclesiastical capital, has caravan routes to Khartum and Berber, and is also connected across the Blue Nile with Addis Ababa. The Sudan Government has leased Gambela on a tributary of the Sobat as a trading-station, and maintains a steamer service with Khartum from January to November.

Eritrea

This province covered about 85,000 square miles, with a total population, including many thousands of Italians, who lived mostly in the towns, estimated at $1\frac{1}{2}$ million. The most densely populated area is that of Hamasien, which contains the capital, Asmara, situated at 7700 feet, with nearly 85,000 inhabitants, who included 50,000 Italians. Reference has already been made to the addition of the old Abyssinian province of Tigre, a largely highland area populated mainly by pastoral Abyssinians, and of the arid Danakil lowlands, largely useless country. The low, sandy

AFRICA

coast is backed by high land except in its central part. That portion of the area which includes the north of the Abyssinian Highlands contains the upper Baraka and Gash rivers, flowing into the Sudan. The coast, with about 7" of rain, chiefly in winter, is hot and arid, but the highlands are not only more temperate, but receive a fair amount of summer monsoon rain, Addi Ugri, at 6600 feet, receiving 21.5". The vegetation varies from semi-desert to savanna and warm temperate forest—the last in the highland districts. Pasture generally prevails, and the Hamitic tribes who form the bulk of the population are largely nomadic. There are large numbers of sheep, goats, and cattle. Asses and mules are widely used for transport, as well as camels and the ox-wagon. Wild products that are collected include beeswax and honey, dom-palm nuts, and gum arabic. The Italians are aiming at modern development in this colony: the streams that come from the highlands are being utilized for irrigation, more particularly in connexion with cotton, the production of which is increasing. Prospecting for minerals is being carried out; gold is being worked in the neighbourhood of the capital, and evidences of petroleum have been found. Of more importance at present is the pearling industry carried on in the Dahlak archipelago off Massawa. The value of the pearl-fisheries is augmented by that of trochus-shell. A good deal of salt is obtained near Massawa and Assab; windmills are used to pump up brine into basins for evaporation, and 50,000 tons were exported in 1937.

Massawa (17,500 inhabitants, including 6000 Italians), on a small island connected with the mainland by a causeway, is the chief port of Eritrea. Since the Italian conquest it has been altered to accommodate large vessels. A single-line railway runs inland through Saati and Asmara, the capital, and continues northward to Cheren and beyond, with a total length of 200 miles. Subsidiary motor-roads are being rapidly developed. A great deal of attention has been paid to providing modern port facilities at Assab, stated to be the best natural harbour on the Red Sea coast. Between this place and Massawa is the potash port of Mersa Fatima.

THE EASTERN HORN

The region as a whole can hardly be regarded as very attractive to Italian settlers, but there is a growing colony in the neighbourhood of Massawa, where streams from the highlands are utilized for the irrigation of sugar and cotton plantations. Oil-seeds are another product. Here a small new city, Vittorio d'Africa, and other settlements have been set up. Further colonizing is hoped for on the elevated lands of Tigre.

Italian Somaliland

This province (including Trans-Juba, west of the Juba river, ceded from Kenya in 1924, and Ogaden, added in 1936) covers about 270,000 square miles, and has a population of 1,300,000, of whom several thousand are Italians. Trans-Juba has an area of 33,000 square miles, and its character is indicated by its population, estimated at 100,000. The province has a broad coastal lowland backed by upland, which rises in the north to about 5000 feet; the highland region terminates in Cape Guardafui, which presents a steep wall to the Indian Ocean, rising sheer for nearly 1000 feet. The monsoons blow parallel to the coast, so that the prevailing heat is little modified by rainfall. The Webi Shebeli and Juba rivers provide water in the southern area, and the Italians are concentrating on agricultural development in this part. Dura, maize, and sesame are the chief crops; successful attempts at cotton-growing have been made. More than half of the total cultivated area of 70,000 acres worked by Italian colonists is under cotton. Camels, cattle, and sheep are reared elsewhere, and Australian sheep are being introduced with a view to improving the fleece of the native breed. The western part—Ogaden—and the northern part are mostly semi-desert land with a thin pastoral population; gums are collected.

The capital and chief trading-port, Mogadishu (29,500 inhabitants), has no proper harbour, but has been artificially improved, and is conveniently situated to serve the Webi Shebeli valley. A railway 70 miles in length runs inland from it, terminating at Villagio Duca degli Abruzzi, one of several irrigation settlements. Merca, farther south, serves

THE EASTERN HORN

in sparsely populated areas. The improvement of native farming, including the better management of flocks and herds, in the areas in which it was undesirable to disturb the native population was another object. Miscegenation was discouraged, as it was intended that the Italians should always remain a distinct community.

How far the economic development proceeded is not easy to say, and it seems that it was still in the experimental stage. Seeing that such development is contingent upon improved communications, it is not surprising that road-making was systematically carried on, and there are now over 2000 miles of good motor roads, over half of this mileage being hard-surfaced. The principal new roads radiate from Addis Ababa; it seems unlikely that the existing limited railway mileage will be much extended in the near future. The chief ports and interior towns are linked by air-routes, the capital being a very important centre.

Having regard to the great area, the total trade is relatively small, and imports in recent years have vastly exceeded exports, because of the development policy that is being pursued. The economic system involves many monopolies and official restrictions. The principal export is coffee, but the drier districts provide small values of hides and skins, wax and ghee, and irrigation areas a little cotton and fruit; an increasing amount of salt is also exported. The leading import is cotton piece goods and yarns, but building materials, petrol, sugar, and soap also have importance. Most of the trade passes through the ports (including French Jibuti), but that across the Anglo-Egyptian Sudan frontier is also significant.

FRENCH SOMALILAND

This territory, formerly known as Obok, and slightly reduced by the cession in 1935 of 300 square miles to Italy, covers rather less than 8500 square miles, with a population estimated at 45,000. The climate and productions are similar to those of Eritrea, though the region is somewhat

AFRICA

more arid. There is, however, little export of local products, with the exception of salt, which is mined. There is an increasing production of salt. The coastal fisheries have local importance.

The inferior port of Obok has been displaced by Jibuti,

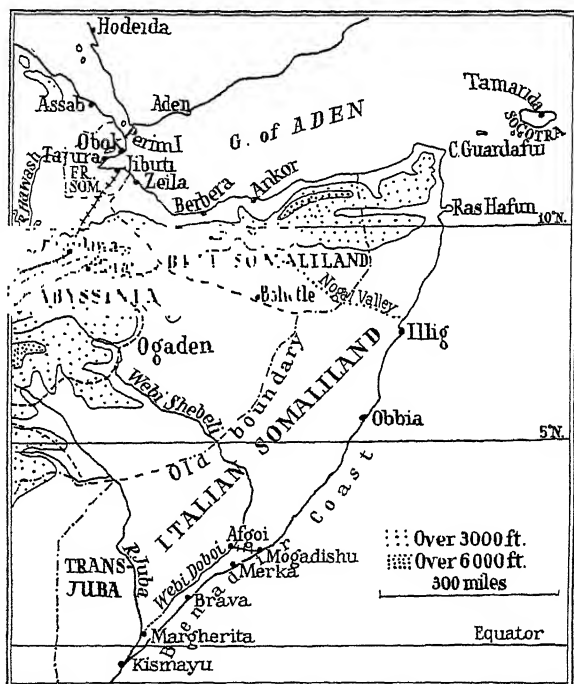


FIG. 56. THE SOMALI PENINSULA AND SOCOTRA

A striking feature is the strip of high plateau running parallel to the Gulf of Aden;
this has a relatively good rainfall.

on the southern side of the Gulf of Tajura. Jibuti (15,000 inhabitants, including 1000 French) is the chief *entrepôt* for the trade of Abyssinia, and has already been mentioned. With modern facilities, this place is an important port of call, chiefly for French ships, and has a commanding position opposite Aden, at the entrance of the Red Sea. The exports

THE EASTERN HORN

and imports, each amounting to about £1,500,000 annually, are largely explained by the Abyssinian trade.

BRITISH SOMALILAND

This protectorate covers about 68,000 square miles, and has a population estimated at 344,000, including some 2000 Arabs and Indians in the coast towns. The remainder are Somalis, a race of mingled negro and Hamitic blood. Europeans are few, and act only as administrators and missionaries. The coast-land is hot, sandy, and arid, and water has to be obtained exclusively from wells; it receives a very scanty and uncertain rainfall, chiefly in winter. Behind, the land rises abruptly to a height of from 4000 to 7000 feet. The best vegetation, savanna in character, with forests of juniper and box, is found on the southern slopes, where a moderate precipitation due to the summer monsoon occurs. 'Tears' of gum (myrrh and frankincense) exude from drought-resisting trees, and there are some plantations of myrrh in the east. The Somalis are nomadic shepherds, and have hardly been introduced to agriculture; they suffered much from the cruel activities of the Mad Mullah, a fanatical Somali chief who raided the British area from the Ogaden district of Abyssinia between 1901 and 1920. The country does not lend itself to the rearing of cattle, though some are found. It is well suited to camels, sheep, and goats, sheep being the most important. The blackhead sheep provides a fine-grained skin regarded as the best in the world for the manufacture of high-quality gloves. The administration is hopeful of developing agriculture; millet is now being raised in the west, and maize- and barley-growing are being encouraged. The geological survey has proved the existence of coal, oil, salt, and other minerals, but there is no present exploitation of these. The coal, found south of Ankor, might prove important, because of its location near the Suez route. Transport is largely by means of camels, but there are considerable stretches of unmetalled motorable roads.

Berbera, whose population reaches 30,000 during the

AFRICA

trading season (when the north-east monsoon blows, bringing traders chiefly from India), is the capital and chief town. Zeila (5000 inhabitants), a very old port, is rapidly losing its Abyssinian trade to Jibuti, only 27 miles away.

In 1937 imports were valued at £680,000 and exports at £286,000. The leading import is grey cotton sheeting, chiefly from Asiatic factories, but fine quality white Manchester cloth is also imported. Rice, dates, and sugar make up the bulk of the rest. Skins and hides are the leading export; livestock are sent to Aden; and there are small exports of ghee and gum. There are no banking facilities in the protectorate, and the commerce is carried on through Aden.

Socotra, 130 miles off Cape Guardafui, is geographically and geologically part of Africa, but politically it is attached to Aden. It is about 1300 square miles in area, with 12,000 inhabitants. It is a plateau in character, with a ridge which reaches 4000 feet at its maximum elevation. The climate is arid. The population is of Arab and negro stock, and is chiefly pastoral and nomadic. A little ghee is exported, the shipping consisting of dhows and native craft. There is no proper harbour. Tamarida, on the north coast, is the only place of note.

CHAPTER VI

WEST AFRICA

GENERAL CONSIDERATIONS

THIS economic region lies roughly south of a line joining the Senegal mouth to Lake Chad—*i.e.*, in the neighbourhood of 15° N. latitude. This line, although not a boundary between well-marked vegetation zones, roughly corresponds to the northern limit of sedentary life so far as it is dependent on rainfall, as well as to a distinct difference in population density. On the east the active development of Nigeria strongly contrasts with the relatively limited exploitation of French Equatorial Africa, thereby suggesting a boundary on this side. Elsewhere the Atlantic, which is the one route common to the whole region, limits the area.

Sailors from Dieppe are believed to have reached Cape Verde in 1364, and subsequently to have penetrated to Benin. In the fifteenth century the Portuguese, seeking the way to India, explored the coast, and were followed by English, Dutch, and other Europeans, including Swedes and Danes. The difficulties of carrying on trade along this coast were great; it offered little hospitality to shipping, and its unhealthy character (the "white man's grave") was a serious drawback. Raiding for slaves persisted to within a century ago, and militated against legitimate commerce. The early trading-stations were necessarily fortified, and a number of 'castles' remain, notably Cape Coast Castle and the Christianborg Castle at Accra, to-day the residence of the Governor of the Gold Coast Colony. Until the nineteenth century European knowledge of the interior was negligible; the travels of Mungo Park were the first to give to Europe real knowledge of the Niger, which provides the chief drainage of this vast region. Nevertheless, the broad

AFRICA

savanna highway of the Sudan had long been a road by which civilizing influences could reach the interior of West Africa, as is evidenced by the survival of the Egyptian shaduf in the grass-lands and by the zebu, or humped cattle. To Egyptian and Arab influence must be attributed the introduction of many of the characteristic crops and domestic animals of the savannas.¹ Hamitic penetration from the north has left its mark on the population of the northern regions. These horse-riding invaders were naturally stopped before the forest belt: forest and the tsetse fly prevented their reaching the Gulf.

Physical Conditions. Stretching from just south of the Senegal, through the Futa Jalon plateau in French Guinea, to the Bauchi plateau in Northern Nigeria is a huge area of ancient granite, gneiss, and crystalline rocks in a broad belt that lies very near the coast between Cape Palmas and the Volta mouth. This reaches an elevation of over 5000 feet in the Futa Jalon area and to the north-east of Liberia. In the Bauchi plateau 6000 feet is exceeded, and the railway at Bukuru reaches 4100 feet. This belt of ancient rock, broken where the Niger enters Nigeria, broadly speaking dips gently northward under the Cretaceous rocks of the Upper Volta and Middle Niger areas, and forms in the Futa Jalon plateau the great hydrographic centre of West Africa—the source of the Niger (Joliba), the Senegal, and the Gambia, as well as of numerous smaller rivers. Very recent deposits are found in the Senegal and Gambia valleys and in that of the Middle Niger—regions liable to flood—while there are recent lacustrine deposits in the neighbourhood of Lake Chad. A considerable alluvial area stretches along the lagoon-fringed littoral between the Volta and the Niger delta—a great swamp district which divides the Bight of Benin from the Bight of Biafra—and in Sierra Leone. Large areas of red laterite occur in the higher parts of this region.

Long denudation has reduced this mass of old rocks to a comparatively low elevation, but its influence on the drainage is of the utmost importance. It sends the Niger

¹ Ground-nuts, maize, cassava, and tobacco were brought by the Portuguese from America.

WEST AFRICA

flowing inland, and, by standing athwart the wet south-west winds, has led to the development of numerous coastal rivers. These are, however, of little value for communication. Those larger rivers that cross over it have their courses obstructed. The importance of this high area, too, in connexion with the drainage changes discussed in the first chapter is very great.

As waterways the rivers suffer not only from rocky obstructions, but from summer floods. The Senegal, whose

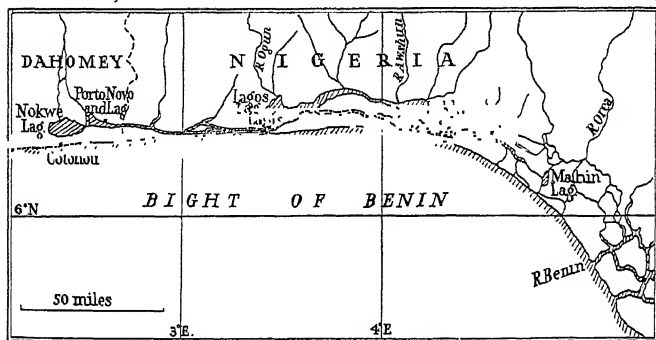


FIG. 57. LAGOON- AND CREEK-FRINGED COAST WEST OF THE NIGER DELTA

A large-scale map would show a much more intricate network of waterways. These waterways are valuable for fishing and for local communication.

mouth is almost blocked with sand in the dry season, is useful up to Kayes except from mid-April to mid-June, when all navigation is suspended. Small vessels can always use the lower 150 miles of the Gambia, and in the summer can reach the Barrakunda Rapids. The Niger (about 2600 miles long) has several navigable sections, of which the most important under favourable conditions are between Kurussa and Bamako, between Kulikoro and Niamey (more than 1000 miles), and below Jebba, while the Benue is useful in the wet season to above Yola, providing an important route to the Central Sudan. Other rivers of West Africa, including the Volta, have only a very limited value, but many creeks and lagoons, including the distributaries of the Niger, have considerable local importance.

AFRICA

Immediately south of Cape Verde the coast is characterized by a number of estuaries. The outstanding one is that of the Rokelle river. The fine harbour of Freetown, at the mouth of this river, and its position at the entrance to the Gulf of Guinea, have made it the nodal point of West African shipping. From here to the Cameroons the coast is marked by an extraordinary network of sand-spits, lagoons, and creeks, broken only by sections of rocky coast in the neigh-

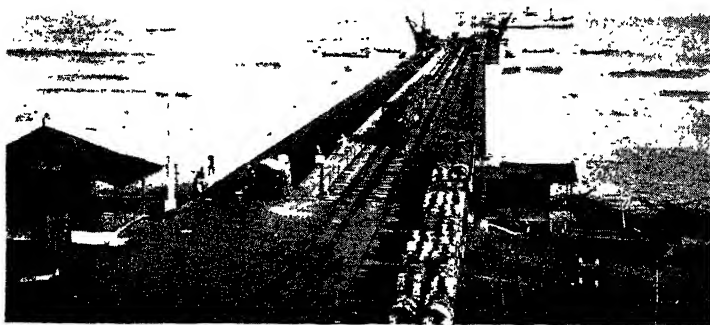


FIG. 58. WHARF AT COTONOU, DAHOMEY

Surf-boats are essential along the West African coast.

Elder Dempster Line

bourhood of Cape Palmas and Cape Three Points. These lagoons are usually difficult to enter from the sea, but the network of waterways is of immense importance in the economic life of West Africa. The Guinea Current in distributing land-waste along the coast has caused a shallowing of the sea near the shore, resulting in a surf-bound coast that is a serious difficulty to shipping. Except where modern improvements allow them to lie alongside quays ships must anchor beyond the surf, and goods must be loaded and unloaded by means of surf-boats.¹

¹ The significance of this is illustrated by the fact that, according to the *Gold Coast Annual Report, 1926*, when five or six ships are anchored off Sekondi the average amount loaded on a vessel is only 180 tons per day.

WEST AFRICA

Climate. Mean annual temperatures in West Africa for the most part vary by no very substantial amount from 80° F. The lowest mean annual temperature is about 75° F., on the Senegal coast, where the Canaries Current has a slight effect ; the highest is at Kayes— 85° F. Those of Freetown and Akassa are 80.5° F. and 78° F. respectively, and the figures for Timbuktu and Dikwa are 84.5° F. and 82.5° F. respectively. But these figures disguise the big differences in annual range. Along the Guinea coast the annual range is from 4° F. to 6° F. ; at Timbuktu it reaches 23.5° F. There is a corresponding difference in the daily range of temperature ; night frosts in winter are not uncommon in the northern region. Along the coast the mean monthly temperature varies little from 80° F. throughout the year, whereas it varies from 71° F. to 94.5° F. at Timbuktu and from 77° F. to 96.5° F. at Kayes. It is plain that, broadly speaking, the winter temperatures decrease and summer temperatures increase northward, and that northern areas experience excessive heat when the sun is vertical. The mean monthly temperatures everywhere show a double maximum, except in the neighbourhood of Cape Verde, and in the north they are relatively close together—at Timbuktu in May and September. The temperature figures as a whole suggest that West Africa is unsuitable for European settlement, though some temperature relief is experienced in the high regions of Futa Jalon and the Bauchi Plateau.

The rainfall is derived from the humid south-west wind that has passed over the warm waters of the Gulf of Guinea. When the vertical sun is north of the equator, and low pressure occurs over the northern limb of Africa, the rainy south-west wind penetrates to the borders of the Sahara, the precipitation decreasing toward the desert. The high edge of the plateau rim is a barrier that necessarily causes the heaviest rainfall to occur on the seaward side, and the special influence of the Futa Jalon plateau and the highlands of Nigeria is brought out by the rainfall map. There is a moderate amount of rain in Senegambia, rapidly increasing toward Sierra Leone and Liberia, remarkably decreasing in

AFRICA

the Gold Coast area,¹ and becoming very heavy again in Nigeria. When the sun has migrated to the Tropic of Capricorn the dominant wind is from the north-east, giving a definite rainless season in the northern belt. Its influence, however, is relatively slight along the Guinea coast, where there is some precipitation in December and January (though only a very small proportion of the total rainfall), brought by the now weak south-west wind. It is clear that the coastal rainfall is broadly of the tropical monsoon type, though east of Sierra Leone there is a double maximum, but the Guinea coast receives some rain in what is the dry season for the remainder of the area, so that its rainfall approximates to the equatorial type. The total annual rainfall for the following stations brings out the coastal conditions : Goree, 20.5" ; Freetown, 157" ; Cape Coast Castle, 35" ; Lagos, 72" ; Akassa, 144" . Examples of interior stations are Kayes, 29" ; Wagaduga, 32" ; Kano, 32" ; Timbuktu, 9" . Much of the interior rainfall is of the thunderstorm type, and the amount varies considerably from year to year. Along the Guinea coast it is largely convectional, in heavy showers, often accompanied by thunder squalls.

What makes the climate of the Guinea coast so difficult for Europeans is the excessive humidity, which is relieved only when the dry and dusty harmattan blows from the east or north-east, reaching the coast intermittently during the dry season. This influence from the Sahara, dust though it is, is locally known as " the doctor." The climate also favours the swamps, in which breed vast numbers of disease-carrying insects.

Vegetation. The lagoons and swampy riverine districts of the Guinea coast are characterized by mangroves, which have an economic value for both their timber and tannin, while one variety in Nigeria is burnt for the sake of the salt in its ash. The areas of heavy rain are naturally clothed with dense tropical rain forests yielding rubber, mahogany, gum copal, kola-nuts, and the oil-palm, though it should be

¹ It has been suggested that the low rainfall here is due to the effect of an upwelling of cold water caused by the south-west winds blowing parallel with the coast where it bends to the north-east.

WEST AFRICA

noticed that varieties of certain of these trees, including the oil-palm, adapted to a moderate rainfall, are met with even in the Gambia. The wasteful native methods of forest-clearing have led to enormous deforestation, as an abandoned clearing usually reverts to a bush type of cover. Sierra Leone has lost the bulk of its forests in this way. It is important to notice that in the central portion of the Gold Coast the amount of rain is such that a natural corridor of relatively open country leads from the coast to the interior. As the drought of the winter season increases northward a belt of more open monsoon forest with many deciduous types is reached, giving way to the typically deciduous savanna forest (where the shea-butter tree is of great importance), in which the general growth of grass gives an open aspect. Here the native forest-fires tend rapidly to increase the area of grass-land. Trees become fewer and more capable of resisting drought, and grass prevails, giving way to thorn-forest and scrub-land, where stunted acacias are very typical and even the grass cover is seriously reduced. The regions beyond the forest present a parched appearance for a very large part of the year.

Development. While the basis of the native population is negro, there is a great variety of type and development. Primitive tribes remain in the highland areas to the north of Sierra Leone and Liberia and in the Bauchi district. True negroes are chiefly found near the Guinea coast, and include the intelligent Kru seamen of Liberia and the Yoruba of Nigeria, who are good agriculturists. The Sudanese negroes usually show a strong infusion of Caucasian blood, and include the Jolofs of the Gambia region, the Fula herdsmen of the Upper Niger, represented in Nigeria by the Fulani, who by the beginning of the nineteenth century had spread a Mohammedan empire over the greater part of the Western Sudan, the agricultural Mandingoes, dwelling to the south of the Fula people, and the agricultural and trading Hausa of North-west Nigeria, the only race in West Africa to reduce their language to writing—the language in which so much of the internal trade of West Africa is carried on. Mohammedanism prevails throughout the Sudan, and seems

AFRICA

to be spreading nearly to the coast, and, whatever view may be taken of the value of this religion imposed from outside the region, there can be no question of the enormous difference made to West African culture by its penetration along the "grass road" of the Sudan and from the north.

With the early trade that followed the Portuguese discovery of West Africa came the introduction of many commodities, important among which were tobacco, manioc



FIG. 59. OLD SELWYN MARKET, ACCRA

Evidences of European influence may be discerned in this photograph.

Elder Dempster Lins

(cassava), and the ground-nut. It is noteworthy that the most important coastal base for West African trade was the Gold Coast, a region in which, owing to the thinning of the forest zone, pressure on the negroes from the north was very great and which provided a large proportion of the slaves.

The latter end of the nineteenth century saw the change of European policy from exploitation to development. As West Africa is unsuited to white settlement, the policy of both French and British has been directed toward stimulating the native as agriculturist, herdsman, and shepherd. In general, this has been pursued without alienation of land

WEST AFRICA

or interference with tribal custom, although, of course, inhuman practices are suppressed and slavery has been all but eliminated. Nevertheless, the British have relied upon what is known as *indirect rule*, which involves administration through the existing tribal authorities and the maintenance of tribal law and custom, the official functions being largely of a helpful and advisory character. The territories are separately administered, and the principles of govern-



FIG. 60. TRADE SCHOOL, GOLD COAST

Technical instruction provides one aspect of the educational work carried on.

Information Bureau of the Gold Coast Government

ment in general are in accord with the responsibilities of a mandatory power under the League of Nations. The French method is perhaps more logical and makes development in the modern sense easier; the extensive territories have common direction under a Governor-General; administration works largely by decree through a hierarchy of officials, many of whom, however, are natives. (The French are more tolerant of colour than the British.) This is the method of *direct rule*. Whatever the method of government, economic development has proceeded by the improvement of native crops and domestic animals, the introduction of new products, the control of diseases affecting man, animals, and plants, agricultural education, the exploitation of

AFRICA

minerals, and the provision of modern communications. In British colonial government there is in the background the idea of the education of the African for responsibility and the stimulating of the native as producer on his own account, and, if indirect rule holds the danger of stereotyping a relatively undeveloped social organization, it aims at building up the character and raising the status of the African, and not Westernizing him into an imitation of a European.

In the forest zone special attention has been directed to the oil-palm and cocoa, and to cotton in certain areas. The difficulties are well illustrated in the case of the oil-palm. Young fruiting stems are tapped and whole trees felled for the native drink, palm wine.¹ The expressing of the oil (obtained from the pericarp, and different from the palm-kernel oil) is often done by primitive methods—in some districts by treading. West African oil is generally poor owing to the poor methods of preparation. Moreover, the need for the cultivation of better varieties is in many cases urgent—in Sierra Leone, for example, the principal variety has a pericarp very poor in oil. There is competition from the Belgian Congo² as well as from plantations in the East Indies and Malaya, where a high-quality oil is obtained from a variety possessing a pericarp very rich in oil. Cocoa suffers from careless fermentation, but the harmattan (which sometimes has a too desiccating effect upon the growing tree) favours the drying process after fermentation, especially in the Gold Coast. Rubber was once an important element in the export trade of West Africa; the huge production of South-east Asia, low prices in recent years, and the cultivation of other products have combined to depress rubber-collecting to small dimensions.

In the savanna zone, where French interests predominate, great attention has been given to ground-nuts, cotton, and cattle. The Government often carefully distributes ground-

¹ This habit has tended to increase with Government attempts to reduce imports of European spirits into British West Africa.

² The growing production of cheap vegetable oil in West Africa and other parts of the tropics has a far-reaching effect inasmuch as it is causing the olive to go out of cultivation in many Mediterranean lands.

WEST AFRICA

nut seed. Varieties of cotton adapted to the climatic conditions (American in rain areas, Sakel for irrigation conditions) have been introduced and suitable seed distributed, native types also being encouraged. Vaccine stations have been established for dealing with epizootic cattle-diseases, and attempts—not very successful—to introduce merino sheep have been made.

In the wetter zone native crops include coconut, banana, piassava, maize, yams, cassava, ginger, kola-nuts, and rice. In the savanna zone millet is the characteristic crop ; others are Guinea corn, wheat, beans, cassava, sweet potatoes, shea-nuts, and castor oil ; cattle, both straight-backed and zebu, are of great importance, and the villages are protected by stockades owing to the presence of lion and leopard. On the borders of the Sahara irrigation is essential for cultivation ; dates are grown, flocks and herds are kept, and the horse, if not found in large numbers, is of great importance, as also are asses. The northern zone is characterized by walled cities and mud houses—in strong contrast with the thatched huts that prevail to the south. It is important to notice that the West African farmer is still essentially a hoeman, as in the time of Mungo Park, and does not take kindly to ploughing. Cowrie-shells and iron strips still form the small change of the interior. Fishing is an important occupation in the lagoons of the Guinea coast ; much fish is sun-dried and exported up-country, while the French are developing fisheries in the west of the region. Salt is obtained by evaporation along the coast, and deposits occur in some inland districts.

The development of mineral wealth is best dealt with in connexion with the political divisions. Railways and roads have been primarily developed to serve the needs of the political areas ; continuous navigation on the rivers is not available. One noteworthy development is the short-circuiting of the Sudan by the French, who have utilized the navigable Middle Niger and the railway from Kulikoro to Dakar. This not only permits the export of the ground-nut crop after the harvest, when the rivers are low, but takes away from British areas trade that might be expected

AFRICA

to pass through them from the otherwise somewhat isolated interior regions.¹ For air-route development see Fig. 30A.

BRITISH WEST AFRICA

Four colonies and protectorates, each with a separate administration under the Colonial Office, make up British West Africa. Apart from Sierra Leone, bordered on one side by Liberia, each is, as regards its land-boundaries, completely surrounded by French-administered territory. The technical division into colony and protectorate is not of geographical significance. Much of the trade is with Liverpool and Hull; the former sends cottons and receives palm-oil, while the latter imports ground-nuts and palm-kernels. The area, including mandated territories, is about half a million square miles, with some 26 million people.

The Gambia²

The total area is rather over 4000 square miles, with about 200,000 inhabitants, including Jolofs, Fula, and Mandingoes. The administrative 'colony' of St Mary's Island covers 4 square miles, and has, with 65 square miles of adjacent land, 14,500 inhabitants. The white population is about 250. The remainder of the Gambia is a protectorate. The whole forms little more than an *enclave* in French Senegal, owing to the neglect of British interests at a period in the nineteenth century when French policy was active in West Africa. The boundary $6\frac{1}{4}$ miles from either bank of the winding river is an illustration of the many arbitrary and unsatisfactory divisions in Africa.

The narrow strip of territory stretches from the coast to the French river-port of Yarbatenda. From June to October is the hot, wet season. Conditions are pleasanter in the dry season. Trees include mahogany, oil-palm (with small heads and small fruits), and rubber (Ceará has been introduced), while piassava grows wild in the swamps; but

¹ The extent of the changes in West Africa in the last fifty years may be realized by reference to *West African Studies*, by Mary Kingsley (1899).

² For map of the Gambia see p. 197.

WEST AFRICA

these have little importance. Bamboos grow along the river-banks. Away from the river there is savanna country. Cattle do well except in swampy districts where the tsetse fly is common. The natives depend upon such crops as rice (grown in swampy districts), Guinea corn, millet, maize, and cassava. Ground-nuts, doing well in the light soil, and carefully nurtured by the Government, are the cash crop, and good yields of more than half a ton of undecorticated nuts are obtained per acre. The small population alone could hardly produce the huge export. Migrant farmers from Senegal, in some recent years numbering up to 20,000, enter the territory in the summer, rent land, and share the crop with the landlord. The number of such "strangers" is decreasing, as the French railways in Senegal have largely removed the necessity of farming near the Gambia highway. The export has averaged some 60,000 tons in recent years, but the economic danger of dependence upon one great export crop is seen when, as in 1938, the price falls heavily.

Bathurst is the administrative centre of this territory, which is Britain's oldest and nearest African possession.¹ There is a depth of 24 feet of water constantly available at the port, and small ocean-going vessels can reach Georgetown (McCarthy Island), the chief up-country trading-station, about 160 miles above Bathurst. Small collecting- and trading-stations are frequent along the river; Basse is one of the most important. There is no railway—indeed, a railway seems superfluous, as small boats can use the whole length of the river in the colony. The river floods in the rainy season, there being a 30-foot rise at Georgetown.

As the labour-supply of the Gambia is very limited, the future prosperity of the region is bound up with the improvement, actively encouraged by the Government, of agricultural methods. Attempts that are being made to establish the cultivation of cotton are not likely to meet with much success at present.

Trade. Imports, valued in 1937 at £801,000, fell to

¹ The Gambia was the first British slaving area, and trading companies were established here in the time of Queen Elizabeth.

AFRICA

£277,000 in 1938, and exports fell from £710,000 to £289,000. The outstanding import items are cotton goods, chiefly from the United Kingdom, kola-nuts from Sierra Leone, metals and manufactured goods, and rice. In 1937 ground-nuts valued at £654,000 were exported, chiefly to France, Germany, Holland, and the United Kingdom; in 1938 prices, and, therefore, the export value, heavily declined, despite a similar export tonnage. Palm-kernels and hides and skins account for nearly all the rest.

Sierra Leone

This colony and protectorate covers 28,000 square miles, of which the area actually administered as a colony (including the Sierra Leone peninsula with Freetown and Bonthe on Sherbro Island) covers 260 square miles. The total population exceeds 1½ millions, and consists, except for about 660 Europeans (most of whom are in the colony proper), partly of "colony Africans," the descendants of liberated slaves brought there in 1787 and subsequently, but mainly of native tribes, including some Fula and Mandingoes. The area rises toward the Futa Jalon in the north-east, where the granite hills reach 6000 feet; the trend of the coast and high land is at right angles to the south-west wind, which brings heavy rain from May to October. There is little fall from December to March, when the average relative humidity falls below 50 per cent. Many short rivers, including the Great and Little Scarcies, the Rokelle, and the Taia, run from north-east to south-west, and are rapidly silting the creeks and estuaries of the coast, so that as the mangrove swamps follow the advancing land, deltaic land, ideal for rice-growing, remains. Wasteful clearing by the natives has reduced the rain forest very considerably, and much has degenerated to low bush and scrub, so that forestry is now an important Government concern. Savanna forest occurs in the highland districts.

Crops. The oil-palm belt is chiefly in the north-east and east, where the palm is wild and abundant; large areas are untouched, as head-porterage is the only means of transport.

WEST AFRICA

The Government is aiming at the introduction of better varieties, as the native ones have a thin pericarp and a thick shell to the kernel. It is the pericarp that yields palm-oil, which should be distinguished from the oil obtained

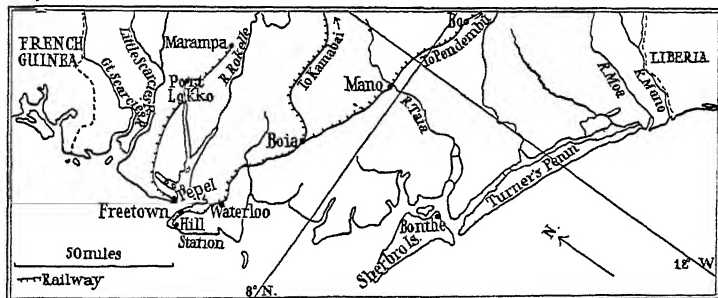


FIG. 61. THE COAST-LANDS OF SIERRA LEONE

from the palm-kernel itself. Owing to this thin pericarp the yield of palm-oil is small. The figures for 1937 in the following table contrast Sierra Leone and Nigeria as producers of palm-oil and palm-kernels.

—	EXPORTS OF PALM-OIL	EXPORTS OF PALM-KERNELS
Sierra Leone . . .	2,325 tons	76,776 tons
Nigeria . . .	145,718 „	337,740 „

The oil is also poorly prepared, and experimental plantations have been started with improved depericarping and nut-crushing machinery.

Also of export importance are kola-nuts. The kola-tree grows wild, but is also cultivated round every village, and is reported to be the best variety in West Africa. Great attention is being paid to other crops. Rice is the staple food, and has long been grown as an upland crop; now extraordinarily high yields are being obtained with swamp varieties near the coast. The poor native ginger rhizome

AFRICA

is being improved and more carefully prepared. Much is hoped for from this crop, the production of which has been fairly well maintained. Cotton has long been carelessly grown, and long-staple varieties are being tried. A ginnery has been established at Boia. The dry season and a poor labour-supply are difficulties in the way of developing the growth of cocoa, but efforts are being continued to increase this crop, though the production is still very small. On the sandy littoral coconuts are now being extensively cultivated, and experimental plantations of bananas and citrus fruits have been made. Coffee has not been successful. Maize, yams, sweet potatoes, cassava, red pepper, chillies, bananas, and mangoes are grown, piassava is plentiful, and gum copal and beeswax are collected. The tsetse fly militates against domestic animals; goats, however, have some importance.

The mineral development has attained substantial importance; a little gold and platinum are produced, but much more important is the hæmatite iron ore mined at Marampa and exported *via* a short railway to Pepel. Recent years have also seen a considerable production of diamonds and the production of a small quantity of chromite ore. These minerals, sent chiefly to Britain, have of late years provided the chief export values.

Towns. Freetown (64,000 inhabitants) has the best natural harbour in West Africa, and is the focus of West African shipping, though lighterage is necessary. It is a second-class coaling-station—ships bunker and water here. In 1937 the vessels entered and cleared totalled more than 4 million tons. This port is only ten days' steaming from England. Sanitation has rendered the term "white man's grave" somewhat out of date to-day. The modern European settlement at about 900 feet is reached by the short railway to Hill Station. The Rokelle river has a navigable lower course leading to Freetown. The waterway between Turner's Peninsula and the mainland, into which a number of rivers run, leads out to Sherbro Island, with the port of Bonthe. The 2' 6" gauge, single-line Government railway, the first British West African line, runs from Freetown to

180

WEST AFRICA

Pendembu, with a branch from Boia to Kamabai; short lengths of motor-road feed it.

Trade.

—	1937	1938
Imports . .	£784,000	£1,500,000
Exports . .	£2,843,000	£2,389,000

Cotton goods are the chief imports, valued in 1938 with apparel at £254,000; other substantial items are coal, oils, machinery, and tobacco. The palm-kernel export was £457,000 in value, much declined owing to low prices. The diamond export (very fluctuating) reached £858,000 in value, iron ore contributed £646,000 and gold £207,000. Smaller items were ginger, piassava, kola-nuts, and palm-oil. The United Kingdom supplies some 60 per cent. of the imports; normally palm-kernels go chiefly to Germany and the United Kingdom, kola-nuts to Nigeria, piassava to Germany, and ginger to the United States.

The Gold Coast

The area is 78,800 square miles, fairly equally divided between the Gold Coast Colony, Ashanti, and the Northern Territories. The estimated total population is 3,260,000, and includes rather more than 2000 Europeans. Roughly rectangular in shape, the Gold Coast stretches from 5° N. to 11° N., reaching into the savanna zone. Among many tribes the Fanti of the south and the Ashanti of the middle zone (both Akan negroes) may be mentioned. A very prominent physical feature is the Black Volta, which cuts across the middle of the colony, receiving the White Volta from the north and the Afram some distance above the point at which the Volta navigation is obstructed. West and south of the Afram there is a dissected highland reaching up to 2000 feet, receiving the heaviest rain and sending the Ankobra and numerous other rivers to the sea; this region carries the densest population. North of the Afram there are

AFRICA

thinly populated plains liable to inundation, but the density increases again on the uplands of the north, north-east, and east of the area. The coast has no estuaries, and its surf is a serious drawback, only partially obviated by long breakwaters at Sekondi and Accra, and emphasizing the importance of the artificial harbour of Takoradi.

Climate and Crops. A notable feature of the climate is the relatively small rainfall, especially round the Volta;



FIG. 62. THE BEACH AT ACCRA

Note the bags of cocoa awaiting export.

Elder Dempster Line

although the coast belt west of Cape Three Points has a mean annual rainfall exceeding 60", Accra's total is barely 30", and in many years fails to reach 25". This relative deficiency of rain, combined with reckless forest-clearing and the encroachment of bush and savanna conditions, may have serious results, especially on cocoa cultivation; indeed, forestry activities are directed toward providing sufficient reserves for the maintenance of the water-supply and the humid conditions upon which the major agricultural industries depend. The 1925 crop suffered from exceptional drought during the harmattan in January, although, on the other hand, a weak harmattan in 1926 resulted in imperfect drying of the cocoa after fermentation. The principal hot,

182

WEST AFRICA

wet evergreen forests are in the south-west; they are bordered by forests containing deciduous types, and merge in the interior and the east into open savanna forest. The

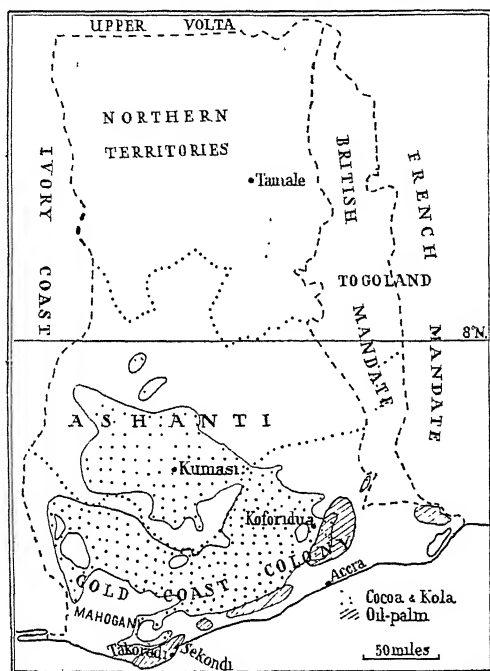


FIG. 63. THE GOLD COAST—IMPORTANT VEGETABLE PRODUCTS

Cocoa and kola-nuts go very closely together. The resources in oil-palm are limited.

Based on a Gold Coast Government map

wetter forest contains mahogany- and kola-trees, and there are limited areas where the oil-palm flourishes. The success of cocoa has largely killed the oil-palm industry, and rubber-collecting—once important—is now only irregularly undertaken.

Cocoa, introduced from the Guinea islands in 1879, has been a phenomenal success. The first export was 80 lb. (£4 in value) in 1891, but it now amounts to fully 250,000

AFRICA

In 1939 some 1000 Europeans and 40,000 natives were employed by mining companies in the Gold Coast.

Towns. Until recently Accra (population, 73,000) and Sekondi (22,000) were the chief ports. The former ships much cocoa, and the latter was an outlet for copra, manganese, and gold. One of the outstanding events, however, in the commercial history of West Africa was the opening in 1928 of the new deep-water harbour of Takoradi, a few miles south of Sekondi. Local granite was quarried for the construction of the huge breakwaters. The cost (£3,200,000) has been justified by the direct loading and unloading facilities the harbour provides on an otherwise unsheltered coast, and by the richness of its hinterland; its development is sufficiently indicated by the fact that it handles some 60 per cent. of the tonnage of goods that enter into the trade of the Gold Coast. Cape Coast Castle, Winneba, Half Assini, and Saltpond are other ports, and Axim exports a good deal of mahogany. Ashanti's chief town is Kumasi (population, 43,000), and the Northern Territories are administered from Tamale. These towns are important motor-road centres; the former is in the heart of the cocoa country, while a veterinary training school has been established at the latter place. There are 500 miles of railway, the principal lines connecting Accra and Takoradi with Kumasi. There are, too, now 6400 miles of roads motorable for the greater part of the year, and head-transport is rapidly dying out. Active educational work is proceeding, and systematic agricultural propaganda is carried on.

Special attention has been given to the establishment of craft schools and of educational institutions suited to the traditions and capacities of the African. Changes brought about by modern developments are indicated by the import of motor-cars, sewing-machines, and typewriters.

Trade.

—	1933	1937	1938
Imports (£1000) .	4,848	19,228	10,380
Exports (£1000) .	8,117	16,218	15,425

WEST AFRICA

The principal import is cotton goods (nearly £2 million in 1937, largely from the United Kingdom). Other large items are machinery and iron and steel goods (including much corrugated iron), while tobacco and petrol (mainly from the United States), sacks, flour, apparel, including artificial-silk goods, automobiles, rice, and soap are other notable items. The peak value of the cocoa export has exceeded £10 million, but low prices in recent years have prevailed, and in 1938 the value of the gold export (approaching £5 million) exceeded that of cocoa (£4½ million). Manganese ore (£900,000) and diamonds (£540,000) followed, timber and palm-kernels being much smaller items. The United Kingdom normally sends 60 per cent. of the imports, taking 40 per cent. of the exports. The cocoa export has generally been fairly evenly divided between Holland, the United Kingdom, the United States, and Germany.¹

Togoland

A portion of former German Togoland is administered as a British mandate (Class B) from the Gold Coast. The area is about 13,000 square miles and the population 340,000; the territory lies along the eastern border, but does not reach the coast. The trade figures are merged in those of the Gold Coast; it is noteworthy that a considerable part of the export of cocoa, palm products, and kola-nuts goes through the French area.

Nigeria

This colony and protectorate—the latter divided into Northern and Southern Provinces—covers, with the mandated strip of the old German Cameroons (34,000 square miles), a total area of 373,000 square miles, with a population approaching 21 millions, of whom some 5000 are Europeans. This is the most densely peopled political division in Africa, and has a larger population than any other dependency of Britain. In the south are pure negro tribes, of whom the Yoruba are especially important. These have a relatively advanced culture, and their country contains

¹ The Gold Coast Government publishes a comprehensive *Atlas*.

AFRICA

several large native towns. The Fulani (Fula) and Hausa of the north show considerable Hamitic admixture. This region is a stronghold of Mohammedanism, the influence of which has so spread that half the inhabitants of Lagos profess this religion. The Fulani are still largely nomadic pastoralists, the Hausa are traders and cultivators, while the Kanuri of Bornu are agriculturists and herdsman. The numerous tribes of the Bauchi region and of that south of the Benue are more backward, and present a serious administrative problem. In the forest belt there are many pagan tribes. The population density per square mile varies in different administrative districts from 19 to more than 150.

Broad lowlands, including the Niger delta, lie near the coast, fringed by lagoons that form an almost continuous waterway. The lowlands penetrate up the Niger and Benue, broadly dividing the country into three blocks of upland, the largest, in the north, including the Bauchi plateau. Much greater heights are reached in the Cameroons strip, where a little volcanic activity survives. The Niger and Benue are navigable in the rainy season up to Jebba and Yola respectively. The Benue and Cross rivers have considerable local importance, and the Rima and Yobe are of value in a relatively dry area, the latter draining to Lake Chad.

Climate and Vegetation. The climatic conditions are typical of West Africa, with gradual changes in temperature northward toward the arid interior. The rainfall, which increases eastward, is much heavier than in the Gold Coast, and on the seaward side of the Cameroon Peak reaches nearly 400" per annum. The heavy rain is chiefly coastal. The angle of high land formed here by the Gulf of Guinea, and into which blows the prevailing south-west wind, is largely responsible for this.¹ Lokoja has nearly 50 inches and Kano 32 inches.

Dense mangrove swamps characterize the coast and delta; certain varieties of mangrove yield tannin from their leaves and bark, besides logs used locally for railway-sleepers. Behind these is the rain forest, roughly limited by the 75"

¹ Compare the heavy rainfall in the mountainous angle of North-east India.

WEST AFRICA

annual isohyet, and containing mahogany, oil-palms, rubber, and gum copals. The Cross river district is important for mahogany and ebony, while there is a small export of rubber, chiefly of native varieties. To the north comes the monsoon forest, where also mahogany is found. This is followed by the savanna forest, which is marked by the shea-butter tree, and is the frequent scene of large forest-



FIG. 65. MAHOGANY LOGS

Information Bureau of the Gold Coast Government

fires, rendering the country still more open. The most northerly belt is one of thorn-forest, with gum acacias, and semi-desert, where settled life is almost entirely dependent upon natural water-supply and irrigation. The Northern Provinces have millet, ground-nuts, cotton, cattle, donkeys, and goats as typical products.

There is evidence of progressive encroachment of the desert upon the savanna zone in the north. The Yobe seems to be bringing down less water than formerly, and the area flooded by Lake Chad is decreasing (p. 207). Further evidence is to be seen in the migration of villages southward in Bornu owing to advancing desiccation. Well-water is, however,

AFRICA

available in this region, and irrigation is common; the Egyptian shaduf survives here.

Productions. The vegetable and animal products of Nigeria are those common to West Africa. Nigeria is the outstanding producer of palm-oil and palm-kernels, particularly the former, and latterly an increasing proportion has come from plantations established by the native farmers.

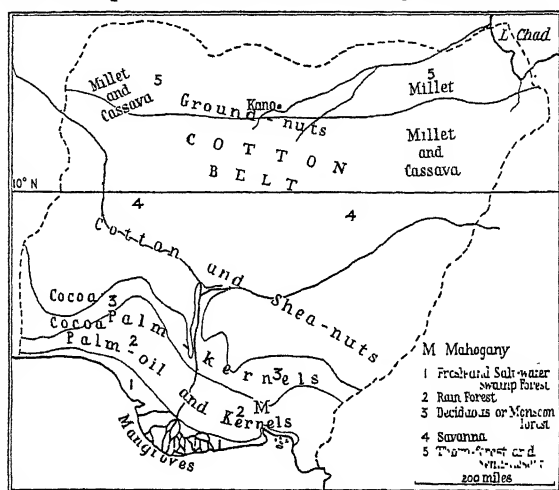


FIG 66 NIGERIA—VEGETATION AND CHIEF VEGETABLE PRODUCTS
Based on a map in the "Nigeria Handbook"

The western districts export a far smaller proportion of palm-oil in comparison with palm-kernels than do the eastern, where varieties with a thicker pericarp flourish. An important by-product is 'palm briquettes,' sold for fuel, and made from the fibrous pulp and shell. As a producer of cocoa, chiefly from north of Lagos, Nigeria is becoming a rival of the Gold Coast, the production, promoted by co-operative societies, now being nearly a third that of the Gold Coast. The kola-nut production has increased so much that imports have greatly diminished, and a beginning has been made with the cultivation of ginger. Cotton has received very great attention; it has long been grown by the natives for local use, and its cultivation by the natives farming for themselves has been encouraged. In

WEST AFRICA

the Yoruba country, where Ibadan is an important centre with modern plant, the people grow a variety of about 1-inch staple. There has been a rapid increase here and in the Northern Provinces; cultivation centres at present on Zaria, its development in the Lake Chad and Sokoto districts being dependent on the establishment of better communications. The export has in some recent years exceeded 40,000 bales of long-staple cotton. In the Northern Provinces there has been a remarkable growth in the production of ground-nuts, which yield a very big export; further development largely depends upon railway extensions, as the effective economic distance for animal transport is about 100 miles from the railway. The trade in hides and skins is of increasing importance. A recent census showed 3 million cattle, $5\frac{1}{2}$ million goats, 2 million sheep, and 180,000 horses in the Northern Provinces; the conditions in the Southern Provinces—largely forested—are much less favourable. The Government is making strenuous attempts to control disease.

Minerals. The mineral wealth of Nigeria is primarily in coal and tin. The railway running north from Port Harcourt was built to tap the only important coalfield in West Africa—that of Udi, for which Enugu is the principal centre. The coal is worked by adit; it is not of very good quality, being of late Cretaceous age and sub-bituminous in character. The annual production is about 300,000 tons; some half of this is used in Nigeria, shipping takes a good deal, and some is exported to the Gold Coast. The railway goes on to

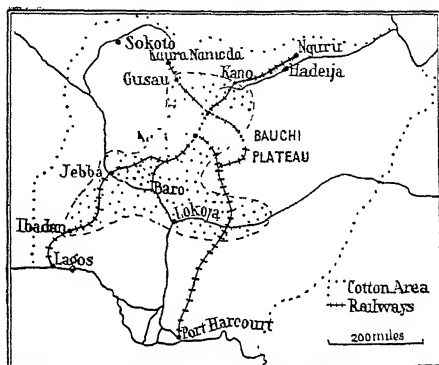


FIG. 67. NIGERIA—CHIEF COTTON AREAS

The cotton for export comes chiefly from the Northern Territories, where the longer staple is grown.

AFRICA

the tinstone area in the western part of the infertile Bauchi plateau, the chief exploitation being in the Bukuru and Ropp granites, for which Jos is an important centre; the annual export of tin ore has exceeded 10,000 tons.¹ Among the mineral wealth of no great importance may be mentioned

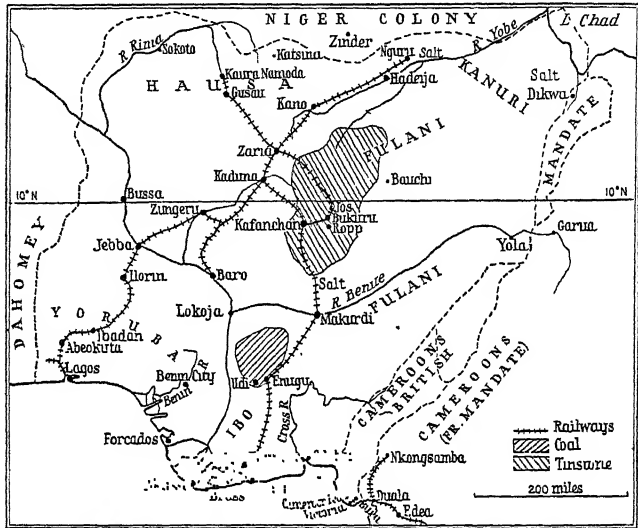


FIG. 68. NIGERIA—CHIEF MINERALS AND RAILWAYS

The map also shows the location of some of the principal peoples.
The town of Dikwa is often referred to as the 'Tin Capital'.

Based on a map in the "Nigeria Handbook"

gold, latterly showing a small but significant production, salt, chiefly obtained from brine springs and ponds, limestone, widely distributed, and silver-lead in the Adamawa area.

Railways and Towns. There are well over 2000 miles of single-track railway, supplemented by about 45,000 miles of motorable roads. Motor transport is of increasing importance for feeding the railways. The main line from Lagos to Nguru suffers from not being constructed to carry uniform loads throughout its length; it is being improved. Lagos (137,000 inhabitants) has the bulk of the trade and shipping. The

¹ The output has varied in recent years according to the quota allotted to Nigeria by agreement among tin producers. It may also be noted that water-power is harnessed to serve this industry.

WEST AFRICA

entrance to the port has been constricted, and a depth of 32 feet of water is now available. Direct discharge at Apapa wharf is an important facility. Port Harcourt ranks next, but a bar and little space for manœuvring will probably prevent much greater expansion; the Udi coal available here is considerably cheaper than that imported at Lagos. Calabar serves the Cross river country, and other ports are Forcados, Bonny, and Victoria. The last is the outlet of the Cameroons area, in which the Germans had developed an export trade in palm products, cocoa, coffee, and ivory.

Inland are a number of large towns. Ibadan, the largest city of tropical Africa, has, with its farming suburbs, 235,000 inhabitants, in a district where active cotton development is proceeding. This glorified village in the Yoruba country is of outstanding size as a native African city. Dominating the north is Kano (80,000 inhabitants), the great Hausa city, with 14 miles of walls, surrounded by an extensive irrigated area. It has been an *entrepôt* for eight hundred years, a market for the Sudan "grass road" and the adjacent Sahara border, and still retains an important trade in salt. Weaving cotton cloth, mostly indigo-dyed, is an old and big industry, and the city is now the great market for ground-nuts. Its old connexions *via* the Sahara have been largely displaced by the railway to Lagos. The line to Nguru has increased its importance. Round Sokoto irrigation development is proceeding, and the branch-line from Zaria junction to Kaura Namoda subserves cotton-growing. Dates, rice, Guinea corn, wheat, indigo, tobacco, and beeswax are among the varied products of this northern region, where donkey transport is of great importance.

Trade. The import of cotton goods (chiefly piece goods from the United Kingdom) is the most valuable import item (nearly £2 million in 1938). Like that of iron and

—	1935	1937	1938
Imports (£1000) .	8,300	18,567	11,567
Exports (£1000) .	12,049	19,575	14,390

AFRICA

steel goods, next in value, it fluctuates with the prosperity of the colony. Fish and salt imports are always substantial, and other notable items are petrol, automobiles, bags and sacks, kola-nuts, cement, and cooper's stores. The palm-kernel export retained its premier position in 1938, but, like most other vegetable products, owing to low prices at a much lower level (£2,168,000). Cocoa was second (£1.56 millions), followed in descending order by tin ore, ground-nuts, palm-oil, hides and skins, and cotton (£250,000). Mahogany and rubber are minor items.

Nearly 70 per cent. of the imports are derived from the United Kingdom, Germany and the United States being normally the other chief suppliers. The United Kingdom takes half the exports, the same other countries being next in importance as customers. Nigeria, like the Gold Coast, illustrates well the common feature of African possessions—that as native production increases an expanding market is created for manufactured goods from the home country.¹

The British Mandated Cameroons

This area (34,000 square miles, 820,000 population) is a Class B mandate, and contains much difficult country, including the Cameroon Peak. Domestic slavery continues in the interior, and there is occasional kidnapping for Fernando Po plantations. The economic products are similar to those of Nigeria, but in addition a rising production of bananas is noteworthy. The small trade figures are merged in those of Nigeria.

FRENCH WEST AFRICA

“L'Afrique Occidentale Française” officially comprises seven colonies—Senegal, French Guinea, the Ivory Coast, Dahomey, the French Sudan, Mauritania, and the Niger Colony, together with the Dakar territory. Nearly the whole of Mauritania and the greater part of the French Sudan

¹ The *Nigeria Handbook* (11th edition, 1936) contains admirable maps and other geographical material.

WEST AFRICA

and the Niger Colony, however, belong to the Sahara region, so that fully half of the total area of more than 1,800,000 square miles is outside the West African region. The area within it is, therefore, about 900,000 square miles, and has a population (1936) of approximately 14,000,000 people with some 24,000 Europeans, two-thirds of whom are French. French West Africa is essentially a broad belt of

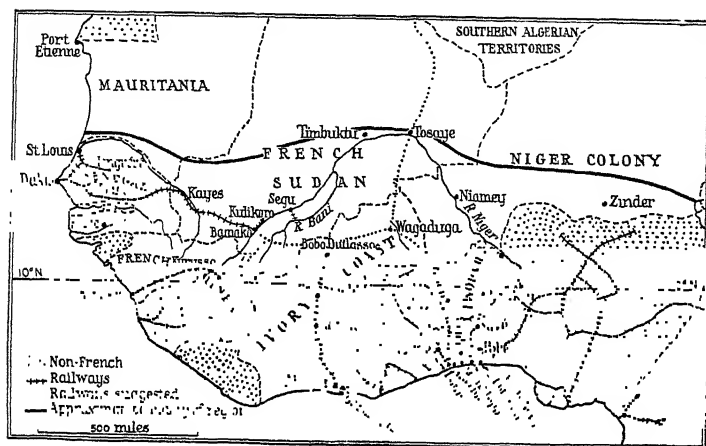


FIG. 69. FRENCH WEST AFRICA

Wagaduga was until 1903 the administrative centre of the Upper Volta Colony. The territory distributed between the Niger and Senegal. The map shows the new boundaries. The scheme of railway development is still in the early stages. The railway from Kulkoro to Dakar.

savanna, merging on the north into the Sahara, and sending tongues southward into the forest zone. The greatest density of population is found in parts of this forest zone, in the western part of the Senegal colony, and in favourable areas of the central Sudanese zone round towns such as Segou, Bobo Diulasso, and Wagaduga. A fair population clings to the valleys of the Senegal and Niger. Broadly speaking, the population density is low, and French development plans are hindered by the limited labour supply. There is a central administration at Dakar to direct and control the

AFRICA

common interests of the colonies. The ambitious proposals for railway development indicate the poor communications that are a present hindrance to rapid progress. A small area of land on one of the Niger mouths has been leased from the British Government for trading purposes.

The economic development has not reached so advanced a stage as in the British areas, but new products are being developed, special efforts having been directed to cotton, now grown in many areas, the total export of which is not yet large, but has been built up from nothing. A striking administrative difference is that whereas France aims at unifying her territories, Britain has organized each of hers separately. There are about 2400 miles of metre-gauge railway, supplemented by some 24,000 miles of motor-roads and 3000 of navigable waterways.

Trade. The table shows the trade of French West Africa.

—	1935	1936	1937
Imports (£1000) .	6,000	7,745	13,555
Exports (£1000) .	6,150	7,824	12,097

Senegal is responsible for some 55 per cent. of the trade, providing about 95 per cent. of the ground-nut export, which is by far the largest item, valued at £3,470,000 in 1937; the next export in value was cocoa (£1,200,000), mainly from the Ivory Coast. Gold reached £950,000; then, in descending order of value, come palm-kernels (£300,000), bananas, coffee, palm-oil, cabinet woods, and cotton (£140,000). The principal imports are cotton goods, chiefly from the United Kingdom and France, other large items being oil, metal goods, machinery, rice, automobiles, wine, sugar, sacks, tobacco, and kola-nuts. Most of the ground-nuts go to France, which does about half the total trade. Kaolakh, Rufisque, and Dakar are the chief ground-nut ports, in that order.

Senegal

Senegal (77,000 square miles; population, 1,700,000, mostly Mohammedan) surrounds the Gambia, and has simi-

WEST AFRICA

lar light and sandy soil. The Senegal and Salum rivers are to the north, and the Kasamance, with a good estuary, and in a region where the wet season is long, is to the south. None of these is a very satisfactory waterway; the Senegal is obstructed by a sand-bar at its mouth, and all navigation is suspended from mid-April to mid-June. A little rubber is obtained from the Kasamance region and gum from the

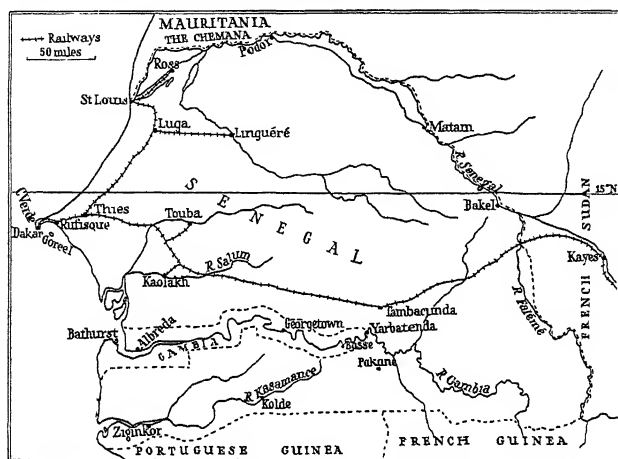


FIG. 70. SENEGAL AND THE GAMBIA

Senegal is the most prosperous of the French West African territories.

northern fringe. The usual savanna products are met with—ground-nuts, millet (mostly excessively small varieties), beans, maize, inferior native cotton, cattle (chiefly of the zebu type), sheep, goats, horses, and donkeys. Some rice, palm-kernels, and cassava are produced in the south, and gum arabic is collected in the interior districts. Methods of tillage and rearing animals are primitive, and labour is scarce. American cotton has been introduced into the south, and Egyptian into the northern area subject to the inundations of the Senegal river. The greatest concentration is upon ground-nuts, of which over half a million tons are produced annually. Salt and fish are obtained in the coastal districts. The capital of this area is St Louis (33,000

AFRICA

inhabitants), but this port, like Rufisque, is declining in importance because of the facilities for shipping provided at Dakar, which now incorporates Goree. Dakar (93,000 inhabitants, including 6500 Europeans), upon which converge half the total trade of French West Africa and the important lines of communication, is situated at the southern end of the Cape Verde promontory. It accommodates vessels of 26 feet draught, has a large dry dock, a submarine cable to Brest, and an oil-seed-crushing industry; it deals annually with more than 5 million tons of shipping, and is a fortified naval base. It is a place of call for French vessels and the air mail on the route to and from South America. Kaolakh (population 40,000) and Ziginkor are river-ports of considerable value, the former, on the Salum river, being the chief port of shipment for ground-nuts.

The Colony of French Sudan

That part of the French Sudan falling in the West African region covers much of the Upper Senegal and Middle Niger basins. Less than half the total area of 580,000 square miles, but more than three-quarters of the total population of 3,570,000, are included in the region. This is mainly a savanna zone, with a rainfall (summer) varying from nearly 40" in the south to 10" in the north. The upper part of the Niger, greatly assisted by its tributary the Bani, causes the summer inundation of the Timbaktu region, creating an inland sea normally covering about 20,000 square miles. Obvious opportunities of irrigation are offered here and on the Upper Senegal, and, in addition to a few pumping enterprises for irrigation cotton, the Sotuba barrage has been constructed just below Bamako and another is under construction near Sansanding. Besides cotton, of which the production is at present small, it is hoped that irrigation will subserve rice-growing and promote cattle- and sheep-rearing. The general farming conditions and products are typical of the Sudan, but a few special points may be added. Besides ground-nuts, which provide the chief export, attention is being given to the karité-nut, also valuable for

198

WEST AFRICA

its oil. In the inundated areas rice is a summer crop and wheat a winter crop, while in the Kayes region flood conditions are utilized in connexion with plantations of sisal and kapok. On the northern fringe acacia gums and the dom-palm are found, dates are cultivated, and camels reared. Large numbers of cattle and sheep are kept, and there is some export southward of live cattle; donkeys are very important for transport. Alluvial gold is found in the Falémé valley.

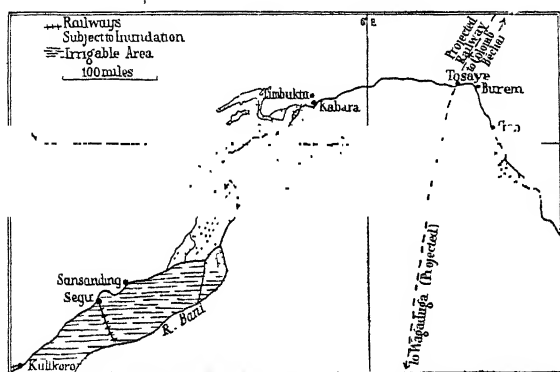


FIG. 71. THE NIGER BEND

It is thought that the irrigable area may be developed on the lines of the Gezira plain in the Ar ro is reached by rail from Dakar, and on the Middle Niger.

The administrative centre is Bamako (22,000 inhabitants), the terminal point of a navigable section of the Upper Niger, and a town of importance even in the time of Mungo Park. Timbuktu (6000 inhabitants), on the edge of the inundations, is an oasis town that has lost a good deal of its importance with the decline of trans-Saharan traffic and the slave-trade; it has various craft industries. Its river-port, 9 miles to the south, is Kabara. A century ago the first European entered Timbuktu and got out to tell the tale. Up to that time it was reputed to be a city of fabulous wealth; it proved, however, to be "a heap of houses badly built of earth" Wars, the slave-trade, and bad hygiene are responsible for a relatively thin population over the

AFRICA

greater part of the area. Communications are largely dependent on the Niger and the important railway Kulikoro-Bamako-Kayes-Dakar. The northerly winds assist navigation on the Niger to feed this railway in the dry season, and the ground-nut crop can be exported as harvested instead of having to wait for the following summer flood. A short railway connects Segou, on the Niger, with the Bani river, serving a fertile area. The Sudan's share of the total trade is slight.

The Niger Colony

The Niger colony is only partly within this economic region (see Fig. 6g). The Sudanese zone is inhabited chiefly by Hausa, who produce the usual savanna crops, and keep many cattle. Niamey, the administrative centre, on the Niger, and Zinder are the only towns of importance; the latter still maintains a certain caravan trade. There is no railway.

French Guinea

French Guinea (97,000 square miles; population, 2,011,000) embraces the greater part of the Futa Jalon plateau. The general conditions are similar to those of Sierra Leone, and Konakri has as much rain as Freetown, but the large upland region is not unsuitable to white settlement, and, already an important cattle-rearing area, could be further developed for maize and tobacco cultivation. The heavy summer rainfall of the coastal districts causes the growth of a good deal of forest. In this zone palm-kernels and palm-oil (especially the former) have great importance, and rubber and timber are obtained. Much is being done to promote cotton cultivation, and there are plantations of rice, bananas, pineapples, and coffee, the last being successfully cultivated near Victoria, on the Nunez river. The banana export has recently considerably increased. The interior is savanna country, providing ground-nuts, sesame, hides, and beeswax for export. Some alluvial gold is found by the upper Niger north of Kankan.

Konakri (population, 14,000), the administrative centre,

WEST AFRICA

is situated on one of the Los Islands. Smaller vessels can discharge at the jetty (more than 1000 feet long), and a road and railway connect this modern and important town with the mainland. The railway passes through Timbo, a cattle centre in the Futa Jalon, to Kurussa, on the Upper Niger, and has been continued to Kankan, on a tributary; motor-roads serve it. The colony does about one-tenth of the total trade.

The Ivory Coast

The Ivory Coast (180,000 square miles; population, 3,900,000) stretches inland between Liberia and the Gold Coast and runs eastward round the northern boundary of the latter territory. Its name has only historic significance. There are numerous not very useful rivers flowing southward from the park-land highlands, the chief of which are the Cas-sandra, Bandama, and Komoe, the last flowing into a lagoon 124 miles long and 12 to 15 feet deep, connected by canal with the lagoon into which the Bandama flows. The western section of the coast is rocky, and the Guinea Current here attains its maximum eastward flow of 3 knots. The most valuable export of the forest zone is cocoa, which has rapidly increased to about one-fifth of the Gold Coast production; mahogany and palm products are also of importance, especially the first. Though the labour problem is difficult, much attention has been given to coffee, kola-nuts, bananas, copra, kapok, and cotton. A little gold is worked near Grand Bassam and elsewhere, and manganese-ore deposits have been located. The northern zone includes the major portion of the old Colony of the Upper Volta. It is savanna country, chiefly important for cotton, of which some is exported, cattle, and karité-nuts; millet is a leading food crop.

Formerly the administrative centre was Bingerville, on the lagoon at the entrance of which is the chief port, Grand Bassam, which has two long jetties, built for the avoidance of its bar. At present goods have to be ferried across the lagoon to and from the rail terminus of Abidjan; improve-

AFRICA

ments are projected. Bassam has a big trade in mahogany, which is floated down the Komoe river. Assinie and Lahu are other ports of note. The railway goes northward from Abidjan (population, 17,500), which is now the administrative centre, to Bwake and Katiola, and has been extended through the Kong country to Bobo Diulasso. It is likely to be continued to Wagaduga (14,000 inhabitants). This town is suggested as the terminus of the projected Trans-Saharan railway; it is an important centre of motorable roads, though they are available for traffic for the most part only from October to June. The Ivory Coast does about one-quarter of the total trade.

Dahomey

Dahomey (43,000 square miles; population, 1,351,000), only about a quarter of the area of the Ivory Coast, normally has a total trade of almost equal value. The natives are pure negroes and good agriculturists, as in the adjacent part of Nigeria. The sandy lagoon coast and the general conditions are similar to those of Western Nigeria. The chief river is the Weme, which flows into a big lagoon. Palm-kernels and palm-oil—the former much the more important—provide the greater part of the exports; this colony is the biggest producer of palm-kernels. The typical forest and savanna products are found, and encouraging experiments have been made with coffee, cocoa, coconuts, vanilla, kapok, and cotton. The sea-island variety of cotton, acclimatized by hybridization with local varieties by the Germans in Togoland, has been introduced into the central districts, and there is now some export. The development of Dahomey is but beginning, as the pacification of the country and its redemption from widespread human sacrifice were achieved only at the end of the nineteenth century. At first Senegalese were introduced, but now labour is recruited in the coastal districts.

Porto Novo (23,500 inhabitants) is the administrative centre, and has a good deal of lagoon traffic—some even with Lagos. The chief trade is done by Cotonou, which has a 1000-foot jetty reaching beyond the bar, but still in

WEST AFRICA

need of lengthening. Each of these towns has a railway running northward; that from Cotonou runs to Savé and Parakou, from which point a metalled motor-road runs to the Niger.

French-mandated Togoland

Togoland (21,900 square miles; population, 737,000) received great attention from the Germans, and was in 1913 their only self-supporting African colony. Cocoa was



FIG. 72. COCONUT PLANTATION NEAR LOMÉ, TOGOLAND
Elder Dempster Line

developed by the Germans, and provides the leading export. The cotton production, though small, is developing. Oil-palm products, copra, and dried fish are also noteworthy, while a recent development has been the native cultivation of coffee. Rubber-collecting has practically ceased. Three lines of railway (see the map, p. 185) radiate from Lomé (population, 13,400), the capital and chief port, which has a large cotton ginnery. Imports and exports were each valued at about £630,000 in 1937.

AFRICA

PORTUGUESE POSSESSIONS

Apart from two islands in the angle of the Gulf of Guinea—considered later—Portuguese territories include only Portuguese Guinea and the Cape Verde Islands.

Portuguese Guinea (14,000 square miles; estimated population, 371,000) is chiefly an area of savanna forest; it has a low, irregular coastline, off which is the volcanic Bissagos Archipelago, containing Bolama, the capital. The chief port is Bissau, exporting mainly palm-kernels. Small quantities of palm-oil, rubber, hides, and beeswax are also sent away. There is little development beyond the coastal region; the problem of transport has received little attention. The total value of exports in 1936 was about £360,000; imports were slightly smaller.

The Cape Verde Islands (area, 1500 square miles; population, 162,000, including 6300 Europeans) are fourteen in number; ten are inhabited. They lie about 300 miles off the coast. They are volcanic in origin, and the highest peak, Fogo, exceeding 9000 feet, has only recently become extinct. The prevailing north-east trades render the islands generally arid, but mountain-fed rivers provide fertile valleys. The islands take their name not from the vegetation, but from the green sargasso weed which drifts there from mid-Atlantic. The seat of government is Praia on Santiago, but the chief commercial centre is St Vincent (population, 20,000), an important fuelling-station and port of call for vessels engaged in the South American trade; it is also a cable-station for South America and West Africa. Coffee of high quality, hides, sisal, oranges, and maize are among a large variety of products. Imports in 1936, including much coal from the United Kingdom for shipping, were valued at £578,000; the exports reached only £26,000.

LIBERIA

This country covers 43,000 square miles, with an estimated population of 1,000,000. The state began with the settlement of a few freed American negroes in 1822. It is esti-

WEST AFRICA

mated that only about 70,000 negroes, including American Liberians, participate in the political life of the country and can be regarded as civilized. Nevertheless, the last few years have seen considerable strides made in bringing the interior under the control of the Government. The European population is negligible, but English is the official language. Rising to upland in the north, Liberia has a rainfall similar to that of Sierra Leone. It is still mainly covered with virgin forest. This is potentially a rich tropical area, but it is estimated that the produce exported from Monrovia comes from within a radius of 100 miles and that from Grand Bassa and Cape Palmas from within 30 miles. It is not necessary to specify the obvious forest products that are available, but it should be noted that the staple product is indigenous Liberian coffee, while piassava and the oil-palm are abundant. Some rubber is collected, and a beginning has been made with Pará plantations. A little cocoa is now produced. Monrovia (10,000 inhabitants), at the mouth of the St Paul river, which has a long sand-spit, exports chiefly coffee, piassava, palm-oil, and palm-kernels. Grand Bassa, at the St John river-mouth, is the chief port for piassava, and Cape Palmas is declining. There is no railway, but each of these ports is served by a short length of motor-road, the chief means of transport still being by porters. Conditions almost amounting to slavery have recently existed in the country, including kidnapping for Fernando Po plantations, and the forcible recruitment of labour, but reforms under the supervision of the League of Nations have been carried out. America has a considerable interest in Liberia, and an American firm has established some 40,000 acres of rubber plantations now coming into bearing. The acute labour problem and low prices have militated against the success of this enterprise. A little trade is at present carried on *via* the Sierra Leone railway. The lower courses of the chief rivers are useful for 20 or 30 miles.

Imports and exports in 1937 were each valued at about £500,000. The principal imports are rice, cotton goods, gin, timber, clothing, and fish; the chief exports—which, as in Sierra Leone, include ginger—have been specified. It

WEST AFRICA

is noteworthy that British weights and measures and British coinage are in use, though the country also has a coinage on a dollar basis; official accounts are kept in dollars.

THE GULF ISLANDS

These volcanic islands lie on the same south-west to north-east line of fracture as the volcanoes of the Cameroons. The maximum elevation, in Fernando Po, exceeds 9000 feet. The soil is fertile, and, lying as they do only a few degrees away from the equator, the islands have a hot and wet climate. On Fernando Po the rain falls mainly from July to October.

The Spanish islands comprise Fernando Po (780 square miles; population, 21,000), Annobon ($7\frac{1}{2}$ square miles), and other smaller ones. Fernando Po, with the capital, Santa Isabel (8500 inhabitants), on the north coast, is one of the most fertile areas in West Africa, but is largely undeveloped, exporting a fair quantity of cocoa and a little coffee, vanilla, sugar, tobacco, and beeswax.

The Portuguese islands of São Thomé and Príncipe (384 square miles; population, 59,000) are much more important. São Thomé is by far the larger, and has most of the population, which includes over 1100 whites. Until 1912 this was the largest individual producing area for cocoa in the world; it was then displaced by the Gold Coast. The cocoa plantations, covering 125,000 acres, are chiefly in the north-east, and, using labour imported largely from Angola, are usually equipped with light railways for transport. In these respects the industry is differently organized from that of the Gold Coast. Excellent coffee is grown, and there are plantations of coconuts, rubber, sugar, oil-palm, cinchona, bananas, and spices. A 9-mile railway goes inland from the port of São Thomé. The exports in 1937 were valued at about £422,000, the imports, mainly cottons, tools, and supplies for the plantations, at about £187,000. Príncipe has recently been purged of the dreaded tsetse fly by strenuous methods. Its plantations are chiefly cocoa.

CHAPTER VII

CENTRAL AFRICA

GENERAL CONSIDERATIONS

THIS vast territory, stretching roughly from 17° N. to 17° S., bordered on the west by the Nigerian area and the Atlantic and on the east by the Anglo-Egyptian Sudan and the Lake Plateau of East Africa, includes considerable diversities of relief and drainage as well as of climate. But its economic connexions are mainly with the Atlantic; it is an area of relative under-development throughout, so that although its vegetable products are very similar to those of West Africa it is in this respect far behind that region in importance. Its dominant central feature is the Congo basin, but it includes a large part of the Chad basin, the upper drainage of the Zambezi, and a number of independent rivers flowing to the Atlantic, the most southerly of which, the Kunene, is the last permanent river before the Orange is reached.

Physical Features. Round the middle course of the river Congo is a relatively low portion of the African plateau, which was formerly submerged. The lowest parts are now indicated by Lake Tumba, Lake Leopold II, and Stanley Pool. Into this basin area converge a large number of streams from north, east, and south; the Ubangi-Welle system drains the northern part, the Kasai and its many tributaries drain the southern area, and many smaller streams the east. In the east the basin rises to the highlands that border the western Rift Valley, which largely exceed 6000 feet, while the volcanic area of Mount Mfumbiro, which blocks the valley between Lake Edward and Lake Kivu, reaches 14,600 feet. This middle Congo basin is cut off from the Atlantic by the high rim of the African

AFRICA

plateau, which varies in elevation from rather more than 1500 feet in French Gabon to over 3000 feet in Northern Angola. The highlands bordering the basin are chiefly composed of ancient crystalline rock; in the north they consist of rolling upland, of no great elevation except in the Adamawa Highlands of the Cameroons and the Dar Fertit region, which well exceed 3000 feet. In the south the Bihé plateau and the Katanga Highlands reach over 5000 feet. The basin itself is filled with Secondary sandstone, but in the swampy areas by the river below the Stanley Falls there are Tertiary deposits.

The Congo takes its rise to the south of Lake Tanganyika, and, passing through Lake Bangweolo, in the swamps of which Livingstone died, reaches this economic region as the Luapula. It is seriously obstructed before reaching Lake Mweru; then, after leaving this lake, it joins with another upper stream from the Katanga plateau to form the Lualaba. The Lukuga, occupying a deep trench, is received from Lake Tanganyika, after which, much interrupted by rapids, the Congo flows northward, to cross the equator at the Stanley Falls. Here it enters its middle basin, and now provides nearly a thousand miles of navigation, despite its frequent division into numerous channels. It is commonly a very wide river, with many islands, in this part of its course, which finishes at Stanley Pool. Below this point it descends by the Livingstone Falls from Leopoldville (950 feet) to Matadi (85 feet) in a course of 220 miles, cutting a gorge through the Crystal Mountains. Below Matadi the Congo estuary is 5 miles broad for about 100 miles to the Atlantic, but shifting sand-banks and a very strong current, especially in the rainy season, make its navigation difficult. It is one of the few rivers of Africa with no delta, but the powerful current in the estuary carries a great volume of muddy water far into the Atlantic. The Livingstone Falls were an important reason for the late discovery of the Congo drainage system, which awaited Stanley's famous expedition from the east in 1876. The lower river was known at a much earlier time. It is obvious that the Middle Congo and its tributaries provide a remarkable network of navigable water-

208

CENTRAL AFRICA

ways, but the river as a whole can never have a unifying influence upon the population of the basin because of the interruptions in navigation and the lack of access to the sea. Nevertheless, the political divisions illustrate the importance that was at first attached to it as a possible waterway; it was internationalized toward the end of the nineteenth century, and the middle river for part of its course became the common frontier to French and Belgian territory. Portugal's footing on the left bank of the estuary recalls that country's early trading days with Africa.

In the Bihé plateau rise rivers running southward to the Ngami basin and the Zambezi. In the north of this economic region the Shari and the Logone, draining to Lake Chad, are having their head-waters captured by the Benue and Ubangi, and flow through a region of soft Tertiary deposits, swampy in summer, into a lake that is obviously shrinking; the rivers, however, are very useful in an area in which little other convenient transport is available.

The Atlantic coast is marked by a large number of short rivers eating into the rim of the plateau, of value for navigation only in their lower courses. The more noteworthy are the Sanaga, Ogowe, Kwanza, and Kunene. The occurrence of a fair number of river-estuaries makes this coast

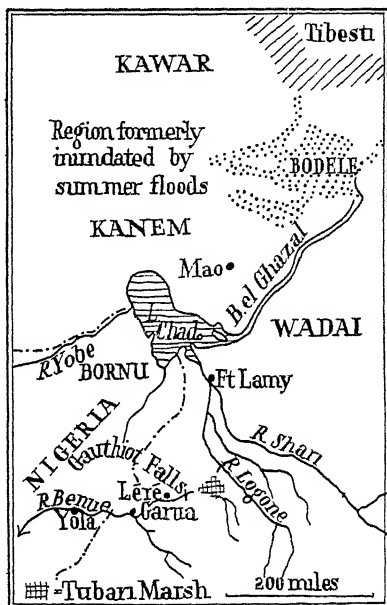


FIG. 73. CAPTURE OF LAKE CHAD,
DRAINAGE BY THE BENUE

It is probable that capture has already taken place at Garua; it is in progress at the Tubari Marsh.

AFRICA

more hospitable to shipping than most stretches of West African coast.

Climate and Vegetation. Stretching through some 30° of latitude, and cut by the equator, this region naturally shows considerable climatic differences. Temperatures are uniformly high, but the greatest summer heat is experienced in the north on the Saharan border. Along the equator the annual range is very small, mean annual temperatures varying little from 80° F. ; the daily range, too, is very small, and in the wet equatorial regions of the Congo basin maximum readings seldom go above 90° F. and minimum readings do not go below 60° F., even in the dry season. The highlands of the east and south, toward the borders of this region, experience considerable modifications of temperature due to altitude. They afford the only opportunities for white settlement in Central Africa ; the Tanganyika Highlands, the Katanga area, and the Bihé plateau are noteworthy in this connexion. The west coast is naturally influenced by the Benguella Current, which reduces temperatures even at the Congo mouth (only 6° S.).

The " rainfall equator "—*i.e.*, the belt with heavy rain all the year round—is relatively narrow, and lies 2° or 3° north of the equator. New Antwerp has 67", the mean monthly rainfall varying from 2·6" to 9·3". Libreville, on the coast and on the equator, has 95", but only an insignificant amount falls in June, July, and August. It should be noted that on the whole the Congo basin receives less rainfall than the Amazon basin, owing to its being less open to oceanic influences. North and south of the rainfall equator the total amount of rain diminishes and the dry winter season becomes more pronounced, while on the coast the warm Guinea Current north of Cape Lopéz tends to increase the rainfall. South of that point the Benguella Current tends to restrict it, so that Banana has only 37" (practically none from June to September), and farther south the aridity rapidly increases along the coastal strip. Most of the rainfall is of the thunderstorm type—heavy or even torrential. In the Congo basin there is a rainstorm almost every afternoon and evening during the wet season, which in many

CENTRAL AFRICA

parts lasts nine months, and the humidity is great even in the dry season, when mornings and evenings often bring dense mists. This is the reason why white people find the climate very trying.

A very large part of the area is covered with dense forest of the equatorial type. The Middle Congo basin is clothed with jungle, which climbs the rim to an elevation of about 3000 feet. In this forest the oil-palm, gum copals, plantains, rubber vines and lianas are the characteristic growths. The number of species of plants is large, and the individual trees of the same type are scattered. Thus commercial exploitation of any particular species is difficult. Above this elevation the forest thins out into uplands of the park-land type, with a good deal of bamboo-forest; with increasing latitude and altitude open grass-lands become common. Such is the country in the interior of the Cameroons, in the Tanganyika Highlands, and in the Bihé and Katanga plateaus. In its lower course the Congo flows through savanna forest, which arises from the relatively small rainfall. The southern half of the coastal strip of Angola is a semi-desert area comparable with that in the extreme north of the region, lying to the east of Lake Chad.

Development. Apart from the mixed Hamitic negro types along the divide between the Congo and the Nile, the population—which is densest by the rivers in the forest zone—consists mainly of tribes of Bantu negroes, the more active and vigorous of which are commonly associated with the more elevated regions. Islands of pygmies, probably representing aboriginal races, remain in the Middle Congo region, the Cameroons, and Gabon. These lead a poor, nomadic existence, and are famous for their skill with bow and poisoned arrow. Portuguese have intermarried with the natives in the coast region, especially of Angola. The whole region—more especially the Congo basin and Angola—suffered tragically from the operations of the slave-trade, the Arabs working from the east coast by the Congo highway and the Portuguese from the west coast. This trade, of course, has now been suppressed.

Broadly speaking, the plant and animal life are very

AFRICA

similar to those of West Africa, as are the possibilities of tropical cultivation and farming on the highlands. Difficult communications have hindered the development of the region—distances from the interior to the coast are great, and the high rim of the plateau and the Livingstone Falls on the Congo are serious obstacles—while the fever-ridden



FIG. 74. CONGO VILLAGE

The huts should be compared with those illustrated on pp. 343 and 352.
Union Castle Line

forest belt, infested by the mosquito and tsetse fly, necessitates active sanitary measures if white traders and administrators are to thrive. The last twenty-five years have been marked by great efforts by the Belgians to promote development in the area, and lessons provided in West Africa and other tropical areas have been studied with profit. The time when the Congo provided a large proportion of the world's rubber by mere collection from wild plants is past, although there is now a little plantation development. The oil-palm provides the staple exports to-day, and among other crops cocoa and cotton are beginning to have importance. Mineral exploitation has advanced actively, and the known mineral resources are considerable; the highlands in the

CENTRAL AFRICA

neighbourhood of the Congo-Rhodesian border consist of richly metalliferous Archæan rock. Railways have been largely developed to avoid the unnavigable sections of the Congo, but the line between Lobito Bay and the Upper Congo is a useful outlet for Katanga, while the railway from Cape Town which reaches this district continues through the Congo basin to the middle Kasai. Viewed broadly, the region is potentially of enormous richness, and rapid strides in its commercial development may be expected in the next few decades. Nevertheless, the white man's part will be mainly confined to administration, trade, and the supervision of agricultural and mineral development. White settlement is at present principally found in the higher parts of Angola, but the highlands bordering the Rift Valley in the neighbourhood of Lake Kivu are beginning to be settled on lines similar to those followed by the British in the Kenya Highlands; the Katanga plateau is probably less suitable from this point of view, as its elevation is not so great; nevertheless, the mining area now has a considerable white population.

FRENCH EQUATORIAL AFRICA

The areas under French administration comprised within this economic region include the Gabon Colony, where French interest began by acquisition in 1841, the Middle Congo Colony, the Ubangi-Shari Colony, and the southern portion of the Chad Colony, together with the mandated portion of the Cameroons. (An area exceeding 107,000 square miles was ceded to Germany in 1911 and added to the German Cameroons; by the Treaty of Versailles this ceded area was returned to France, and is incorporated in French Equatorial Africa, which comprises the four colonies mentioned above. The mandate applies only to that territory which was German before 1911.) The total area within the Central African region (excluding the Saharan portion of the Chad Colony) is about 850,000 square miles, and the population is rather more than 5 millions, nearly half of whom are in the mandated Cameroons, with about 6000 Europeans. The Governor-General of French Equatorial

AFRICA

torial Africa has his headquarters at Brazzaville, on the Congo. The combined values of imports and exports, which had been steadily increasing, in 1937 totalled £10 million; of this trade the Cameroons were responsible for about 40 per cent., so that the undeveloped character of the area as a whole is obvious.

Leaving aside the Cameroons for separate consideration, French Equatorial Africa includes a number of coastal rivers, of which the Ogowe is the most important, separated by high ground from the Congo and Ubangi, as well as from the Shari river draining to Lake Chad. The Benue is rapidly penetrating the Shari drainage system, thus making its contribution to the general desiccation of the Saharan border. The coast is similar to that of West Africa, but there are a few useful inlets, notably the Gabon estuary, on which is the port of Libreville. The proportion of equatorial rain forest is not very great; it is chiefly found in the Gabon and in the southern portion of the Middle Congo Colony, where Brazzaville, just above the Livingstone Falls, has increased in importance since the completion in 1934 of the railway, 320 miles long, to Pointe Noire. This work was hindered by high mortality among the native workers and by difficult engineering. The chief development, limited though it is, is found in the coastal districts. The principal exports are timber (chiefly okoumé, similar to mahogany, from Gabon), palm-kernels and -oil, while there is a small rubber production. Piassava, copal, and the usual native crops are found, and attention is being given to coffee, cocoa, bananas, and vanilla. Northward the conditions become drier and the country more open; the typical products of the inhabitants are similar to those of the Sudan—maize, millet, ground-nuts, and cotton. Cattle and sheep become important, especially in the Chad Colony (see also pp. 104–105), where limited transport facilities make this area of little present importance for export. Fort Lamy is the administrative centre of the Chad Colony; it is situated on the Shari, which, with the Logone, has considerable local importance as a highway in summer. Banghi, on the Ubangi, is a river-port, and the administrative centre of

CENTRAL AFRICA

the Ubangi-Shari Colony. Libreville, the administrative centre of the Gabon Colony, has relatively good shipping facilities, but Port Gentil, at the mouth of the Ogowe river, does most of the trade of this colony. The Middle Congo railway has established Pointe Noire as an important port, facilitating the export of oil-palm and other products from the Middle Congo and, by the Ubangi-Congo waterway, the trade of the Ubangi-Shari and Chad Colonies.

French-mandated Cameroons

The French mandate (Class B) covers about 166,500 square miles, and has more than $2\frac{1}{2}$ million people, with over 3000 Europeans. The coast receives a heavy rainfall, and has unhealthy mangrove swamps. The chief river is the Sanaga. There is little actual lowland, except in the north, toward Lake Chad, where savanna conditions prevail. The Germans had commenced development on lines similar to those followed in West Africa, and the French have actively continued the work, so that now there are 320 miles of railway and 3200 miles of motorable roads. The principal exports come from the coastal districts, and are palm-kernels and palm-oil, and increasing quantities of cocoa and bananas. The extensive forests have much valuable timber, and mahogany is exploited to some extent. Small quantities of ground-nuts, rubber, and ivory are other items. Duala is the chief port; it was built by the Germans some way up the Cameroons river, and is a modern town with fair shipping facilities. One railway runs eastward from it through Edea to Yaunde (population, 20,000), the administrative centre, on higher ground more than 100 miles from the coast. Another line runs north-east; its extension is projected as far as Garua, in the Sudanese zone, a town which is able to take advantage of the Benue, as it is a relatively short distance above Yola, in Nigeria. This line may eventually go on to Fort Lamy. The Sudanese zone, with typical savanna occupations, may become important for cotton when transport facilities are improved. Between the coast and this zone is a belt of highland whose possibilities for cattle-rearing are being investigated.

AFRICA

SPANISH GUINEA

This lies about the Rio Muni, and includes several small islands, the largest of which, Corisco, has an area of $5\frac{1}{2}$ square miles. The total area is about 9500 square miles and the total population about 90,000, including fewer than 200 whites. The Spanish footing here survives from earlier slaving times. The mainland is dense forest, and there is a small trade in the usual forest products, with a little cocoa, coffee, and sugar. The islanders' chief occupation is fishing. The only places of note are Benito, on the estuary of the Benito river, and Bata. The area is administered from Santa Isabel, in Fernando Po (see p. 206).

THE BELGIAN CONGO

The area of this important region is rather more than 900,000 square miles, with a population of nearly $10\frac{1}{4}$ millions. At the end of 1938 there were 25,200 Europeans—fully two-thirds of them Belgians—an indication of the great interest taken in the exploitation of the area. Nearly a third of the Europeans are in the Elizabethville Province, one of the six provincial divisions, and containing the important mineral-producing districts of Haut Katanga. It is estimated that two-thirds of the region is open or relatively open country, and a considerable proportion of this is said to be suited to white settlement. After an unpleasant history in connexion with the rubber trade, the Congo Free State, founded by King Leopold II of Belgium after Stanley's great journey, was annexed to Belgium in 1908, and the recent development has been remarkable. The trade has been increasing, largely because of the exploitation of mineral wealth, itself dependent upon the provision of railways. Nevertheless, Belgium has found the problems of the administration and development of this great area difficult to handle.

The opportunities for and obstacles to tropical development studied in West Africa are repeated here. The development involves the overcoming of difficulties which include disease (especially malaria and sleeping sickness), bad transport

CENTRAL AFRICA

facilities, shortage of labour, constant activity in connexion with sanitation, agricultural research, the education of the African in improved methods, and the careful provision of means for him to maintain his food-supply and at the same time dispose of his cash crops. Some indication of what has been done is given by the great increase in the export of oil-

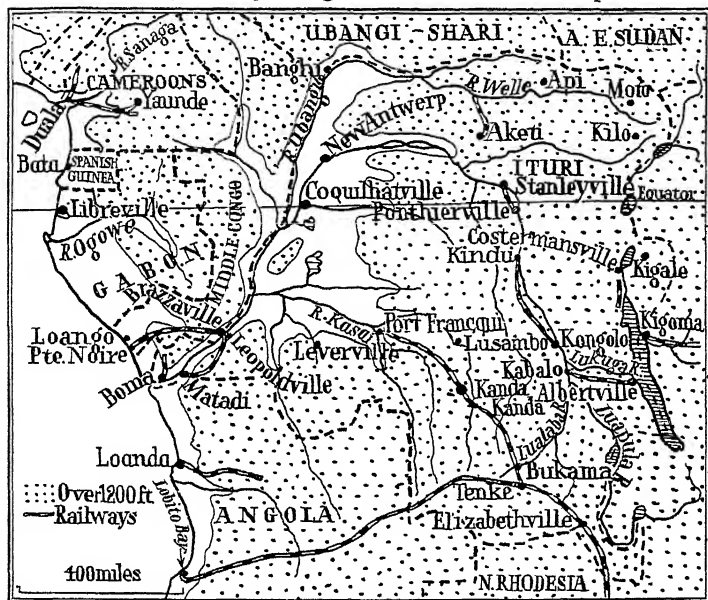


FIG. 75. THE BELGIAN CONGO AND FRENCH EQUATORIAL AFRICA

Note the constriction of the Congo basin in the lower course of the river. For the Katanga district in greater detail, see Fig. 80. The provincial capitals are Leopoldville, Coquilhatville, Ponthierville, Kindu, Costermansville, Stanleyville, Lusambo, and Kigoma.

palm products, the development of cocoa, coffee, and, more especially, cotton, the improvement and increase in the number of cattle and sheep reared, the control of animal diseases, and the concentration of communications upon the highly mineralized Katanga district. It may be noted that at Api, in the Welle district, elephants are trained for transport work, successful experiments in training buffalo have been carried out, and an attempt was made in the Katanga district to domesticate the zebra.

AFRICA

Crops and Livestock. The natives depend, as may be expected, upon their small cultivation of rice, yams, plantains, cassava, and, in some districts, pulses, sugar, maize, millet, and ground-

nuts. The rivers are an important source of food, being rich in fish; the crocodile and hippopotamus are also caught. The elephant, though hunted, is still fairly numerous in the Congo basin, where the sandstone formation gives rise in many parts to a relatively thin type of forest. The oil-palm has great value for food and other purposes, and tobacco and native cotton have long been grown.



FIG. 76. YOUNG OIL-PALM

The collecting of the large fruiting heads from mature palms involves an enormous amount of climbing.

Information Bureau of the Gold Coast Government

The most important development has been in the increase in oil-palm products, and the natives are encouraged to nurture and

extend the palm-groves round the villages. The yield of palm-oil is large, and its export value normally exceeds that of palm-kernels. Striking progress has been made in the production of cotton, especially in the Welle district and the eastern parts of the basin, and the long-staple upland variety has been introduced with great success; the principal difficulty has been in connexion with the laborious work of ploughing

CENTRAL AFRICA

the land for the crop, a process distasteful to the African. The production, however, has steadily increased to an annual volume of some 30,000 tons, and has provided Belgium with a large proportion of her requirements. As in both British and French areas in tropical Africa, special attention has been given to this crop.

The collection of wild rubber is not important to-day, most of the small rubber production coming from plantations. Wild coffee-trees abound, and the *robusta* variety is now being extensively cultivated, chiefly round the Lower Congo. Cocoa in the Mayumbe district has not been so successful as was hoped, owing largely to the irregularity of the rainfall and the attempt to cultivate it without shade; elsewhere along the equator cocoa cultivation is developing. Rice, sugar, and sisal are also receiving attention; the first two are growing slowly. The establishing and development of new crops is hindered by labour difficulties, while low prices in recent years have, as elsewhere in Africa, militated against their success.

These are the products upon which Government attention is particularly concentrated at the present time. Similar efforts are being directed toward stock-rearing. The highlands of Katanga now have a fair number of cattle, stock from Northern Rhodesia having been introduced. The success of this work of cattle-rearing has not been so great as was hoped, as disease is still a difficulty, necessitating the regular use of arsenic dips, though much of the plateau is above the level at which the tsetse fly is met with.

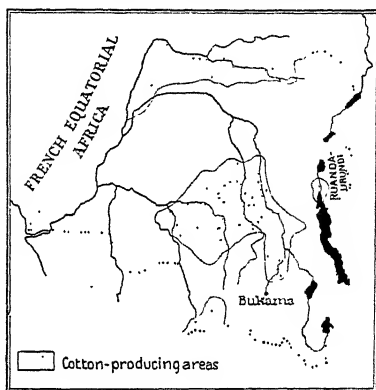


FIG. 76A. COTTON-GROWING DISTRICTS OF THE BELGIAN CONGO

Several hundred thousand native families are now growing cotton, with Government encouragement.

Based on an official map

AFRICA

The collection of gum copal from the swamps provides a considerable export (though tending to decline as agricultural development proceeds); the export of ivory is still of importance; but the timber export is small.

Minerals. In the heart of Central Africa is a mineral area (extending across the Congo border into Northern



FIG. 77. COPPER-MINE, KAMBOVE
Modern mineral exploitation in the heart of Central Africa.
Union Castle Line

Rhodesia) that has attained great importance. It is already a large producer of copper, contributes largely to the world's limited supplies of radium, and is rich in many other minerals. Mining operations in the Belgian Congo to-day employ many thousands of natives. A valuable adjunct is the occurrence of plenty of water-power for the generation of electricity. This Katanga district of the Elizabethville province contains Kambove, the chief centre of copper-mining; it has been called "a mountain of copper." The Star of the Congo, just east of Elizabethville, is a famous copper-mine, and there are smelters at Jadotville (formerly Panda). The radium ore, a rich pitchblende, comes from

CENTRAL AFRICA

Chinkolobwe. In the same region tin, uranium, cobalt, and zinc ores are found, and the production of tin has become significant. Coal is mined at Sankishia, though it is of inferior quality. Iron is worked in the same area, and limestone for smelting is plentiful. Katanga, with its mining population, is served by the railway from Rhodesia with food-products and good coal and coke from the Wankie field. The mining development is mainly in the hands of the Union Minière de Haut Katanga. The production of copperingots has varied owing to international quota arrangements; it was 150,000 tons in 1937; it suffers from the handicaps of long transport distances and inefficient labour. The provincial capital is Elizabethville, where the Europeans alone number nearly 3000. The railway from the south reaches the navigable Congo at Bukama

The output of diamonds from alluvial workings in the Kasai basin has increased so much that the Belgian Congo has become

the world's largest producer. The diamonds, however, are mostly small and inferior stones, and are mainly useful for industrial purposes; the output fluctuates considerably with the world demand. The production in 1938 exceeded 7 million carats. Gold-bearing reefs are being exploited in the Kilo-Moto area north-west of Lake Albert, and a considerable output has been reached. Inferior coal is worked in the Lukuga valley. Minerals now account for three-quarters of the total export values of the Belgian Congo.

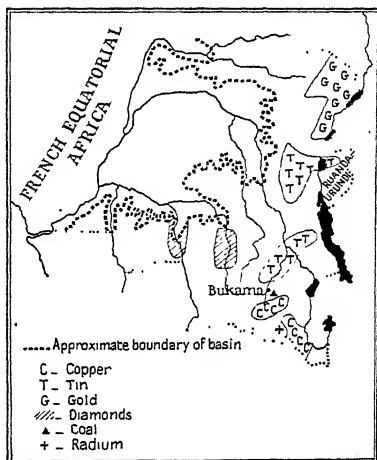


FIG 77A. THE MINERAL AREAS OF THE BELGIAN CONGO

The 1600-foot contour is taken as the rough boundary between the sandstone floor of the basin and the crystalline rim. Note how the minerals are confined to the rim of the basin.

Based on an official map

CENTRAL AFRICA

Angola reaches the Katanga line at Tenke, between Kambove and Bukama; this railway provides the most direct route to the Atlantic, and therefore to Europe, and has stimulated development in Northern Rhodesia, while opening up undeveloped territory *en route*.

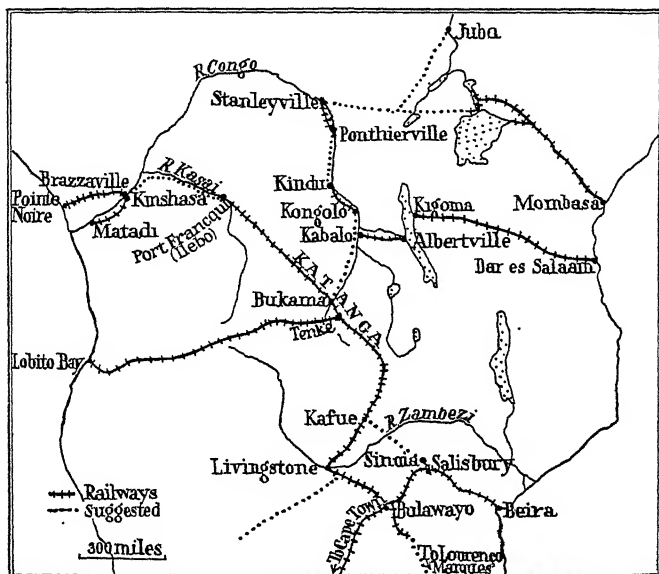


FIG. 79. RAILWAY RIVALRY IN CENTRAL AFRICA

The development of Katanga has led to considerable railway construction, and several ports are rising as a result. The first export of copper *via* Port Francqui (the 1900 place in the middle of 1928 and from Lobito Bay in 1931. The direct line Pointe Noire—Brazzaville was opened in 1934, but, of course, after French liberation of Africa.

There is a good deal of congestion on the Leopoldville—Matadi railway, as so much traffic has to pass through this bottle-neck, which climbs the Crystal Mountains to avoid the Livingstone Falls. It has the characteristics of a mountain railway, rising to 2200 feet near Thysville, and had originally a gauge of 2' 6". It has been improved and the gauge widened to 3' 6"; should it be linked up through Port Francqui with Katanga a railway route of uniform gauge would be provided between the Congo mouth and Cape Town.

The relationship of Katanga to the African coast is shown below:

AFRICA

Elizabethville to Matadi, <i>via</i> Port Francqui	1600 miles
„ „ Dar es Salaam, <i>via</i> Lake Tanganyika	1610 „
„ „ Beira, <i>via</i> Bulawayo	1620 „

The first and third routes involve two breaks of bulk and the second four. The Lobito-Katanga railway now provides the shortest way to a seaport—only 1300 miles from Elizabethville. This railway has practically eliminated the former export of Katanga copper *via* Beira and Dar es Salaam.

Railways are suggested from Stanleyville to Juba, on the White Nile, and to Kampala, in Uganda, passing through the gold area and serving the Welle cotton district, as well as the highlands of Ituri, but there is little prospect of their construction in the immediate future, though a beginning has been made from Stanleyville. The total length of the railways is now over 3000 miles. Several light railways are in operation, and there has been considerable road development, especially in the gold and diamond areas. The total length of motor-roads now exceeds 40,000 miles. Regular air-communications are maintained between the principal towns.

Towns of the Lower Congo. Leopoldville (2500 whites), which is opposite Brazzaville, at the lower end of Stanley Pool, is the administrative centre of the Belgian Congo; it incorporates Kinshasa, the principal river-port of the Congo and the centre of the trade in oil-palm products. Of the colony's three deep-water ports, Matadi, on the left bank, is the highest one to be reached by ocean-going steamers. Great improvements have recently been made, and a few miles lower down a new harbour is now available at Ango-Ango, so that Matadi, incorporating Ango-Ango, has become the principal port of the colony. An oil-pipe line is in use from Matadi to Leopoldville to supply oil for the use of steamers on the Middle Congo. One of the difficulties, now largely overcome, connected with Matadi is that the river has a difference of level between the dry and the wet season amounting to about 26 ft. Boma is on the right bank; a light railway runs northward from here to Chela, in the Mayumbe district. Up Banana Creek at the entrance to the estuary is the outport of Banana, which deals with a smaller volume of shipping than Boma.

CENTRAL AFRICA

Trade. The volume of trade has steadily increased. On the basis of 150 Belgian francs to the £ sterling, imports were valued at £7,580,000 and exports at £16,580,000 in 1937.

The development of the territory largely accounts for the imports of machinery (totalling £1.2 million in 1937), and steamers and ships to a similar amount. Cotton goods nearly reached the same figure. Mineral oils and foodstuffs bulk large among the imports, which also include many manufactured goods, automobiles, tractors, coal, coke, and live cattle, the last three largely from Rhodesia. The leading export is copper ingots (£5½ million in 1937); gold accounted for £2½ million, tin for £1½ million, diamonds for nearly £1 million. Of the vegetable products, cotton leads in value at £1¾ million, followed by palm-oil (£1¼ million), palm-kernels (£1 million), with decreasing values of coffee, copal, sugar, and rubber. Ivory, silver, and radium ore are figured in the exports; the production of the last seems to be declining. Belgium normally supplies nearly half the imports; some three-quarters of the exports go to Belgium.

The Mandated Territory of Ruanda-Urundi. This Class B Belgian mandate lies east of Lake Kivu and the northern part of Lake Tanganyika. It largely consists of Rift Valley highlands, and includes the volcano Mfumbiro. It has an area of rather less than 21,000 miles, and its estimated population of over 3½ millions, fully one-third of that of the Belgian Congo, reflects its suitability for human occupation as compared with the latter region. With over 1000 Europeans, there has been a certain amount of white settlement. Soils are generally rather poor, but a beginning has been made with coffee and with the breeding of cattle and sheep, for which purpose some stock has been introduced from the similar highland region of Kenya. The wealth of the natives is mainly in cattle, and live stock and hides figure in the exports. Tin production has begun (1100 tons in 1938). The mandate is administered with the Belgian Congo; there are over 3000 miles of motorable roads, and educational and other social services are being built up. Exports and imports each amounted to about £1½ million in 1937.

AFRICA

ANGOLA

Portuguese West Africa, Portugal's largest possession, covers nearly half a million square miles, and has a population of 3,484,000. Of these some 60,000 are whites—mostly Portuguese—some of whom were born in the colony, and 22,000 are half-castes. Portuguese traders have frequented this coast since 1575. The territory includes the Kabinda *enclave*, some distance north of the Congo mouth, which also had its origin in early Portuguese trading interests. The Bihé plateau, rising to well over 5000 feet, has a rainfall that probably exceeds 50", and which drains to the Congo, the Zambesi, the Ngami depression, and the Atlantic, the chief rivers flowing to the Atlantic being the Kwanza and the Kunene. Temperatures are tropical, somewhat modified in the higher parts and along the coast, where the cool current flows. The prevailing wind is off-shore, and the rainfall, which is very low on the south-west coast, is chiefly in summer, so that savanna vegetation prevails, there being only a relatively small amount of forest, chiefly in the north and north-east and on the western scarps of the higher plateau areas.

Products. Wild products include the oil-palm in the north, mainly in Kabinda, where cocoa is grown, and rubber (of little importance to-day, though Ceará has been planted in the Loanda area), ivory, and beeswax. Native cultivations include manioc, maize, tobacco, castor oil, beans, and ground-nuts; cattle are important, especially on the interior uplands, where sheep are also reared. On the plateau cattle-rearing and maize production are growing, an increasing number of white farmers becoming interested in these activities. There are now important coffee plantations, especially in the Cazengo district, 200 miles east of Loanda, and round Porto Amboim. Tobacco is widely grown, sisal has been introduced, and, largely with the aid of irrigation, sugar and cotton are cultivated, the former more successfully than the latter. Fishing is important along the coast.

The mineral wealth is probably great; it includes malachite, copper, iron, and gold, but the most important mineral export in recent years has been diamonds, mostly small; the

CENTRAL AFRICA

field is an alluvial one, and continues that of the Belgian Congo. Salt is obtained from coastal lagoons.

Towns and Railways. Loanda (formerly called São Paulo de Loanda, population, 31,500) is the capital. It has a fair harbour, several soap- and tobacco-factories, and an important line running eastward through a fertile area to

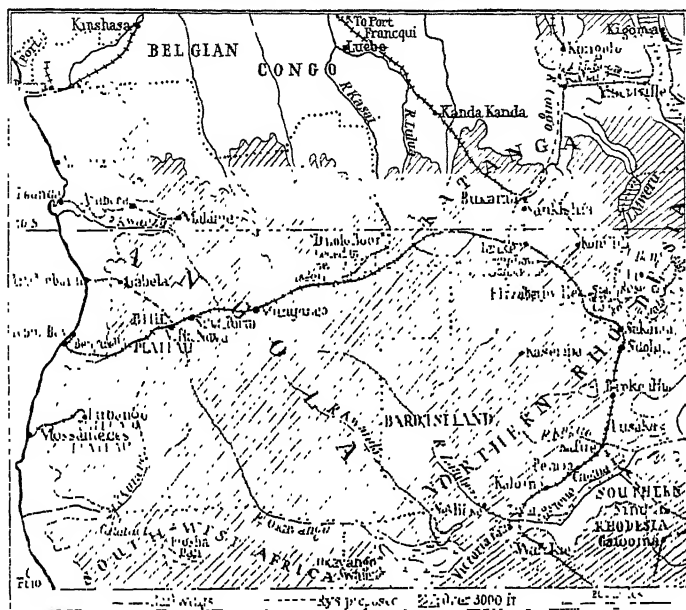


FIG. 80. ANGOLA AND THE KATANGA AREA

The line from Lobito Bay roughly follows the Congo-Zambesi divide; it reaches a maximum height of over 6000 feet in the Bihé plateau.

Malanje. Lobito has a fine natural deep-water harbour protected by a long sand-spit. It was formerly a great slaving-centre, and has considerable oyster-fisheries. Its railway, of 3' 6" gauge,¹ runs to the Belgian Congo frontier, where Belgium some years ago ceded a small area—known as the "Dilolo Boot"—in exchange for a minor rectification of the frontier by the Congo estuary, and the Belgian line

¹ This is the standard gauge of the railways of South Africa.

AFRICA

continues it to Katanga. The Lobito railway has become very important, not only because it serves the great mineral district (p. 221), but because already it is opening up what may well become a vast farming area on the Bihé plateau. The railway, too, for the most part traverses high ground, and should be relatively free from floods. It first goes to Benguella, an old port with an open roadstead, and, after passing through an arid belt about 120 miles wide, reaches the higher and better-watered plateau. The wetter plateau slopes grow coffee, sugar, sisal, and cotton, while maize production on the plateau itself has rapidly expanded, and wheat is a winter crop. Cattle-rearing is general on the Bihé plateau, and a considerable native population is met with. At Vila Nova, some 300 miles along the line, it is proposed to construct a link with the Gabela railway. The railway workshops are at New Lisbon, 35 miles west of Vila Nova. New Lisbon has grown up with the railway, and is the centre of important roads, including the main road to Rhodesia. The greatest height reached by the Benguella railway is 6081 feet.

A light railway has been constructed from Porto Amboim to serve a district of increasing importance for coffee and cotton. Mossamedes is a centre for irrigation sugar and cotton, besides having a fish-curing industry. It has a short narrow-gauge railway, being widened to metre gauge, passing through the coastal dry belt to the Huila plateau, where there are a number of Boer colonists.

Trade. In recent years the country has steadily progressed, and railway development, the growth of plantations, notably coffee and maize, and of cattle-rearing by European interests, have contributed to the improvement. Imports and exports, both substantially increased, reached £1,954,000 and £3,125,000 respectively in 1937.

CHAPTER VIII

EAST AFRICA

GENERAL CONSIDERATIONS

ZANZIBAR occupies a central position on the coast of this region, which lies roughly between 5° N. and 15° S. latitude, and stretches across to the western branch of the Rift Valley.

The relief runs in parallel belts from north to south. In the west is the long and broad Lake Plateau, somewhat diversified in altitude, but with an average elevation of about 4000 feet. To the east of this is the section of the Great Rift Valley extending from Lake Rudolf to Lake Nyasa—both of which have a surface-level of about 1560 feet—with its western branch through Lake Tanganyika to Lake Albert. In Kenya its floor rises to over 5000 feet, but in Tanganyika Territory it is much lower, and not always clearly defined. In Kenya the valley shows very steep escarpments, which considerably exceed 6000 feet and form a difficult barrier to communications east and west. The great extent of the subsidence in some places is indicated by the fact that the deepest parts of both Lakes Nyasa and Tanganyika lie below sea-level. The volcanic peaks of Kenya and Elgon—the former snow-capped and with seventeen small glaciers—rise respectively east and west of the Rift Valley. Farther south is the volcanic peak of Kilima Njaro, the highest point of Africa (19,320 feet), with its ice-capped crater. On the eastern side of the Rift Valley the plateau continues, until it falls in terraces to the coastal plain, which, except in Kenya, where it is much wider, has an average width of about 45 miles. Apart from the volcanic rocks chiefly associated with outpourings on the borders of the Rift Valley,¹ the geological formations are chiefly of the ancient

¹ There is little volcanic activity to-day, though Mount Mfumbiro is occasionally in action.

AFRICA

crystalline rocks so characteristic of Africa, but rocks of Carboniferous age occur in the coastal plain. The rocks seem to be rich in minerals, but lack of detailed knowledge as well as very difficult conditions, resulting in poor communications, prevent any considerable exploitation at present. The mineral wealth includes gold, tin, diamonds, and some coal; the first two have some significance.

The drainage of the Lake Plateau and the Rift Valley is somewhat complex. Into Lake Victoria drain several streams, of which the Kagera, coming from the west, is the largest. Lake Victoria is the great reservoir for the Nile, which descends the Ripon Falls, and, after draining the Kioga lake and swamp area, drops to the Rift Valley over the Murchison Falls, then joining Lake Albert; Lake Albert is a second reservoir for the Nile, and is fed by the Semliki river from Lake Edward and the great crystalline, glacier-clad mountain-mass of Ruwenzori, or the "Mountains of the Moon" (p. 235). There are some areas of inland drainage both on the Lake Plateau and in the Rift Valley (*e.g.*, Lake Rudolf), and Lake Tanganyika, with its surface at about 2500 feet, only occasionally discharges to the Congo by the Lukuga. In the east of the region the drainage is toward the Indian Ocean; the more noteworthy rivers are the Tana (fed by the snows of Kenya), Pangani, Rufiji, and Rovuma. Deltas have been formed at their mouths, since, owing to the narrow continental shelf, there is only a small tidal effect. Off the coast are many islands, partly alluvial and partly coral, and coral reefs, broken opposite the mouths of the rivers, lie off parts of the coast. The rivers of East Africa are of little use for navigation, though the Nile provides a waterway between Lake Albert and Nimule, and the east coast rivers have short navigable stretches near their mouths. On the other hand, the great lakes supply very valuable means of communication.

Climate. The variety of relief gives rise to great differences in temperature, and relief and latitude combine to bring about differences of rainfall, so that a rather complex arrangement of climatic regions is found. The vertical sun is experienced everywhere twice in the year, and two periods

EAST AFRICA

of heavy rainfall result, except in the south, where the two are merged into one rainy season, and along the equator by Lake Victoria and in the highest parts, where there is considerable precipitation all through the year. The pre-

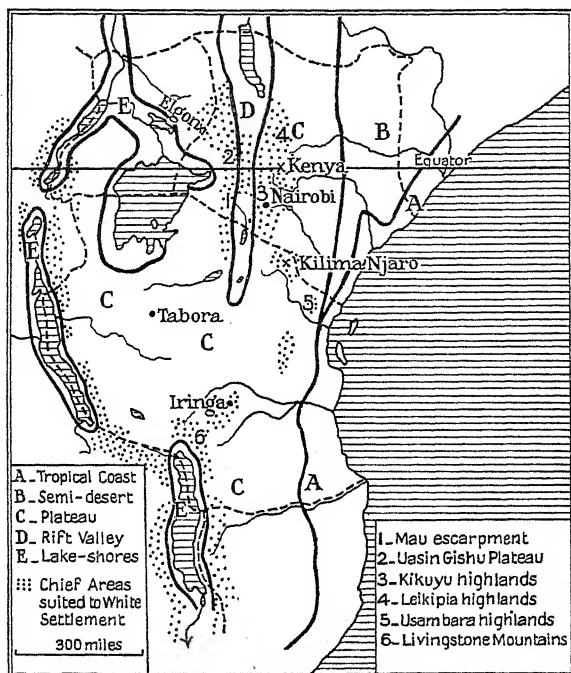


FIG. 81. REGIONS OF EAST AFRICA

Kenya contains a large compact area upon which white settlement is taking place; it is served by the Kenya and Uganda Railway (see Fig. 85). Only the well-defined portion of the Rift Valley is shown.

Regions based upon Kendrew's "The Climates of the Continents"

vailing winds vary with the Asiatic monsoons; broadly speaking, they are from the south-east in the northern summer and from the north-east in the southern summer. The following climatic regions may be distinguished:

(1) The *coastal plain*, which is hot and moist. The rainfall decreases considerably toward the north, and comes

AFRICA

chiefly in the southern summer. Coastal mangrove swamps are characteristic; behind them are forests adapted to a period of relative drought.

(2) An *arid belt*, chiefly in Kenya, consisting of the lower eastern part of the plateau. In Southern Kenya, where it is known as the Taru jungle, this region is a strip about 40 miles wide, separated from the coast by a belt of forest of similar width, but in Northern Kenya it reaches a width nearly half that of the colony. The southern part enjoys a moderate rainfall; the north has very little, and owing to a porous soil the grasses and the thorny and fleshy plants nowhere provide a complete covering to the dusty soil.

(3) The *main plateau* covers the remaining area except for the Rift Valley and certain lake-side districts. The important differences within the plateau itself are chiefly due to elevation, so that above 5000 feet white settlement becomes possible. Nairobi, at 5450 feet, has a mean annual temperature of 63° F. and an annual range of 6.7° F., while Tabora, at 3983 feet, has a mean annual temperature of 72.5° F. and an annual range of 7.2° F. The more important regions suited to white occupation are (a) the Mau escarpment west of the Rift Valley continued northward in the Uasin Gishu Plateau, (b) the Leikipa and Kikuyu highlands east of the Rift Valley, (c) an irregular belt of highlands stretching from Kilima Njaro through Usambara to the Livingstone Mountains, north-east of Lake Nyasa, and continuing southward into Portuguese territory. These higher areas have a greater rainfall, often reaching 50", while the lower parts have usually less than 40". The vegetation is, broadly, of the savanna type, but stunted drought-resisting trees and thorn-shrubs characterize some parts of the plateau, as in the Masai steppe and the Rukwa depression. On the higher plateau areas there is much forest, perhaps best seen on the Aberdare Mountains, which rise to 12,800 feet east of Gilgil, and the timber resources in Kenya are already being exploited to some extent. Everywhere on these plateau regions the daily range of temperature is considerable, necessitating protection against cold, but only on the highest parts is actual frost experienced, and this is never severe.

EAST AFRICA

The plateau offers climatic conditions for a variety of products.

(4) The *eastern Rift Valley*—which almost disappears as a feature in Central Tanganyika Territory—has a generally sub-arid climate which is very pronounced round Lake Rudolf, where there is a wide belt of arid scrub-land, and is further indicated by such inland drainage lakes as Natron and Manyara (see Fig. 85). Rainfall and elevation increase toward the central part of Kenya, where white settlement has taken place.

(5) The *lake-shores* of Tanganyika and Nyasa and the northern and western shores of Victoria are in general hot, wet, and swampy. The lakes themselves are largely responsible for the rainfall, which is usually of the thunderstorm type. There is a good deal of forest. The same moist, unhealthy conditions characterize the shores of Lakes Edward and Albert and the Kioga lake and swamp area.

(6) The *high mountains* have various zones of climate and vegetation. The rainfall is heavy, and there is forest, varying from tropical to temperate, on the slopes up to about 12,000 feet. Above that are mountain pastures, shrubs, and more lowly vegetation. The snow-line is about 16,000 feet.

Development. The Portuguese reached this region toward the end of the fifteenth century, and their efforts to maintain themselves north of the Rovuma river brought them into conflict with the Arabs, who finally frustrated them early in the eighteenth century. Exploitation of ivory, both white and black, was a main interest of the Arabs, and the principal connexion of the coast with the hinterland was, under their control, concerned with this trade. The modern exploitation dates from the charter given to the Imperial British East Africa Company in 1888, which was followed by the transfer to the Imperial Government of Uganda in 1894 and of Kenya in 1895, and from the charter given to the German East African Association in 1887, the German protectorate being declared in 1889. In each case the primary importance of communications is brought out by the fact that the first section of the Usambara Railway was completed in 1893 and the Uganda Railway in 1901,

AFRICA

while the Central Railway of Tanganyika reached Tabora in 1912 and the lake in 1914. The importance of motor-cars and -lorries is very great, having largely superseded other forms of transport (apart from railways), while bicycles and motor-cycles find a market among the natives. The air-mail route to the Cape passes through East Africa *via* Port Bell and Mombasa; Nairobi is an important air junction.

The productions vary with the climatic regions. Tropical cultivation prevails in the coastal districts and by the lakes,



FIG. 32. SISAL

Information Office of H.M. Eastern African Dependencies

while the plateau is a stock-rearing area, with typical savanna crops like maize, millet, and sesame. It is white influence and white settlement in the highlands that have raised the commercial importance of this region, and efforts have been particularly concentrated on cotton, coffee, sisal, and maize, while recent mining development has been noteworthy. To-day East Africa is an outstanding producer of sisal, but there is keen competition in this from other producing areas, as well as the rivalry of Manila hemp.

Bantu tribes form the majority of the inhabitants, but there are also a number of Hamitic negroid types, including the Masai, with a large sprinkling of Arabs and Indians along the coast and in the towns, where the chief trading language

EAST AFRICA

is Swahili, a modified Bantu tongue. The existence on the plateau of both agricultural tribes (such as most of those of Uganda, the Kikuyu of Kenya, and the Bukoba of Tanganyika Territory) and pastoral tribes (notably the Masai) should be noted. The differing political status of the three territories is of importance; the administrative method of indirect rule generally prevails, but there is no uniform native policy, largely owing to the considerable white settlement in Kenya and to a lesser extent in Tanganyika Territory. A commission reported in 1929 in favour of closer administration under a High Commissioner, with more co-ordinated development and a more uniform native policy. There is free trade between the three territories, while Uganda and Kenya are in one customs union.

UGANDA

After being controlled by the Imperial British East Africa Company, this area became a protectorate in 1894. It covers about 94,000 square miles, including 13,600 square miles of water. The population is $3\frac{3}{4}$ millions, including 19,000 Asiatics (mostly Indians) and 2300 Europeans; a small number of the last are settled on leased Crown lands in the higher areas of the west and east. The natives include negro and Hamitic types, but more than half are Bantus. Uganda is plateau in character, but the eastern part contains the highland area of Mount Elgon, and the Rift Valley in the west is bordered by the Toro plateau, dominated by the Ruwenzori range (the "Mountains of the Moon"), on the eastern flank of which is a little-touched region of extinct craters, small lakes, forest, and varied animal life.

Climate and Production. Lake Victoria has some effect in modifying temperature, and "land and sea breezes" are common on its shores. The rainfall is convectional, resulting from the constant high altitude of the sun. Although the prevailing vegetation cover is of the park-land type, there is a good deal of actual forest,¹ containing mahogany,

¹ The Uganda forests resemble in both appearance and species those of West Africa, and differ from the characteristic forests of the Kenya highlands.

AFRICA

African teak, bamboo, and plantain. There is much marsh by Lake Victoria and Lake Kioga, and here the tsetse fly is prevalent. This insect pest has been dealt with by clearing the ground and planting lemon grass, and sleeping sickness has been all but eliminated. There are no horses in Uganda, but much of the wealth of the people is in humped cattle, the number of which has increased to about 2 millions, owing to increasing control of rinderpest and other diseases.



FIG. 83. COTTON-PICKING, BUSOGA DISTRICT, UGANDA
Information Office of H.M. Eastern African Dependencies

The natives are good cultivators, and since 1906, when the first considerable planting of cotton took place, have steadily increased the production of this crop. At the present time Uganda is producing more cotton than any other single portion of the Empire except India. Now some 1 $\frac{3}{4}$ million acres are under cotton of the American upland type, chiefly in the Eastern and Buganda provinces (*i.e.*, east and west of the Victoria Nile), and the cotton produced provides the greater part of the export values.¹ Europeans do not participate in this cotton-growing, but the Government has done much to encourage the native cultivators.

¹ The significance of this is suggested by the fact that forty years ago Uganda's exports were ivory, rubber, hides, and oil-seeds. Later coffee took first place, but cotton has now predominated for many years.

EAST AFRICA

Coffee, grown up to about 6000 feet, is the chief concern of European planters, principally in the west in the Toro district. They are growing chiefly Arabian coffee, but natives are rapidly taking up the cultivation of both this and the *robusta* varieties. Fluctuating yields of cotton have led to increased attention to coffee, the cultivation of which is assisted by the Government. Cocoa, often planted between bananas, has not been very successful. In recent years sugar-cane cultivation along the northern shores of Lake Victoria has much increased, and a surplus is now available for export; this industry is mainly in Indian hands. Tobacco cultivation is increasing, while tea and even wheat—the latter at the foot of the volcanic Mount Elgon—have received attention. There is a small and declining production of Para rubber. The natives grow ground-nuts, sesame (simsim), maize, cassava, and some upland rice, but their principal food-crop is the banana, which also provides fibre and a sap from which a kind of soap is made. Native crafts are well developed, and there are about 200 ginneries.

The mineral wealth includes deposits of tin in the Ankole district, in the south-west; these have yielded a small but steady production. A little alluvial gold is worked in the same area. Near Lake Albert are indications of oil. The power of the Ripon and other falls is available for development.

Towns and Communications. Uganda is an inland country, and its development must depend upon the provision of transport facilities. Before the protectorate was established the natives had created what was, for Africa, a considerable road-system. There are now 800 miles of roads available for motors in all weathers, including the Sudan Road, which runs from Jinja to Juba. Until the beginning of 1928 Uganda's chief connexion with the outside world was by what was formerly called the Uganda Railway, which runs in Kenya from Kisumu to Mombasa—a single metre-gauge line which became seriously congested when the cotton crop was being transported. The cotton centre of Namasagali on Lake Kioga is connected by rail (formerly called the Busoga Railway) with Jinja, a port formerly sending much cotton by steamer to the Kisumu terminus.

AFRICA

Now there is a direct connexion between Mbulamuti on the old Busoga Railway *via* Tororo with Nakuru Junction on the Uganda Railway, and this, by avoiding the break of bulk at Lake Victoria, has greatly eased the transport problem. Moreover, Kampala, often called the commercial capital of Uganda, is now connected by rail with Jinja; it is a large native market-town in a district producing cotton, coffee, and sugar; it is the capital of the important Baganda people, and has a short railway connecting it with Port Bell, on



FIG. 84. VIEW OF PART OF KAMPALA

Kampala, the "commercial capital of Uganda," is built upon several hills. The photograph shows one of the good roads of Uganda.

Information Office of H.M. Eastern African Dependencies

the air-mail route to the Cape. From Tororo a branch line runs through important cotton country to Soroti. The centre of the British administration is Entebbe, on Lake Victoria; it also possesses a station for research into tropical diseases. Sleeping sickness has been completely stamped out here.

To-day motor-vans have almost completely displaced the native runners formerly used for mail services. Several native 'kingdoms' are recognized, and the administration encourages development on lines similar to those adopted in the West African colonies. The "native problem" does not arise in the acute form which it assumes in Kenya.

Trade. The figures for Uganda, usually combined with those of Kenya, are given at the end of the next section.

EAST AFRICA

KENYA

Kenya is a Crown colony except for some small coastal areas—part of the dominions of the Sultan of Zanzibar—which constitute a protectorate. The area is about 225,000

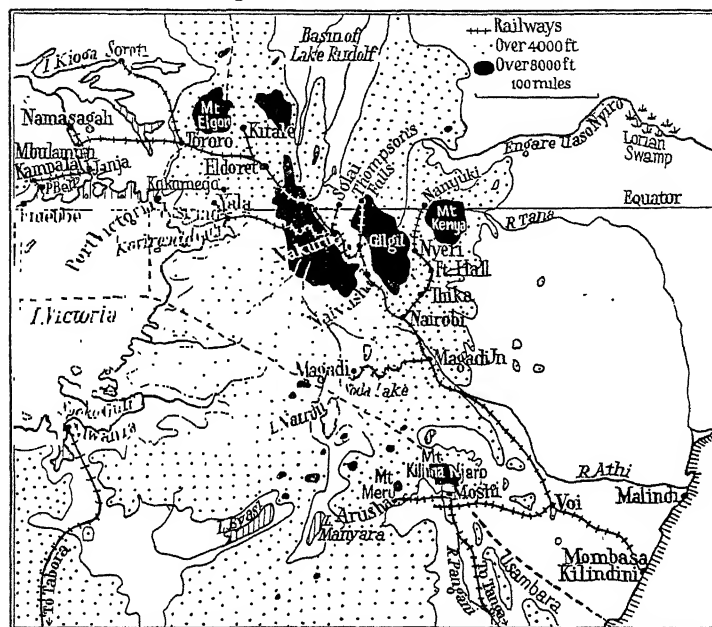


FIG 85. THE KENYA AND UGANDA STATE RAILWAY

This map brings out the varying elevation of the Rift Valley and some of the lakes of inland drainage that mark it. The main line is now from Mombasa to Kampala, via Eldoret, Mbulamuti, and Jinja.

square miles. The population is estimated at about 3,254,000, including over 19,000 whites (some being South African Dutch), 42,000 Indians, and 13,600 Arabs; both Indians and Arabs have representation on the Legislative Council, which is, however, dominated by Europeans. There has been friction with the Indian Government over the status of its nationals.

The physical features have already been dealt with; the

AFRICA

outstanding feature is the compact area of highland upon which the white population is settled.

Products and Settlement. The most important coastal product is the coconut-palm; long cultivated by Arabs, it has recently become an object of interest to European and Indian planters, and there is a small export of copra. Rice is increasing in importance, and the lower Tana area is being developed. Other products include mangrove bark and poles, sugar, cotton of good quality, tobacco, and fruits like the banana and mango, as well as cassava. Most of these products are unimportant in the northern drier coastal region.

The lower parts of the plateau are largely native reserves, and cover a great area; pastoral occupations are the most important, large numbers of native cattle—of the zebu, humped type, small but hardy—sheep, and goats being kept. Apart from hides and skins, the principal native product available for export is ghee (clarified butter). Maize, millet, simsim, and ground-nuts are crops that might be developed. At present the Kikuyu and Nyanza provinces are most important for native crops, and here recent interesting developments have been in the native cultivation of sugar, cotton, and wattle (the last for its bark, which is rich in tannin).

The highlands of Kenya provide a remarkable example of white settlement and development under the equator. Large areas of the highlands have been alienated for white occupation; there are about 2000 European occupiers, who are at present, however, cultivating only a small proportion of the occupied land. But it is important to notice that the Europeans are planters and ranchers who depend upon native labour for the ordinary farm occupations, and the supply of this labour is a matter of serious concern to them. Relatively temperate climatic conditions are added to a good and usually reliable rainfall; there is a variety of soils, including volcanic and sandy areas, and the differences of elevation permit a considerable range of products. About 2 per cent. of the area of Kenya is forested, and the bulk of the forest is in the highlands. A number of valuable trees occur, and already the need for reafforestation has

EAST AFRICA

arisen, although local demand and difficult transport to the coast militate against an export trade. The coast belt yields certain valuable hard timbers, as well as mangrove poles. At about 5500 feet are the muhuga-forests, unfortunately largely cleared for coffee; the muhuga-tree provides a hard, resistant timber, and plantations of it are now being formed. The next zone is that of the 'cedar'-forests (6000 to 9000 feet, on western slopes); there are several varieties of 'cedar,' one (actually a juniper) being suitable for pencil-making; this belt contains the most important of the trees of Kenya. The zone of so-called camphor-forests, from 7000 to 9000 feet, receives an abundant rainfall, and the accompanying vegetation is luxuriant; the 'camphor'-trees provide good timber. From 8000 to 10,000 feet are the bamboo-forests, consisting of a single species, which would be available for the pulp industry. In addition to the forests there is an enormous area of more open land, suitable for mixed farming.

Coffee is the crop at present of greatest economic importance to the white settlers, who are exclusively responsible for its cultivation, its acreage having rapidly increased in the last decade, especially in the Kikuyu highlands. Wild coffee occurs, but the *arabica* variety is chiefly cultivated, the best elevation being about 5000 feet. Kenya coffee is of good quality, and the annual export averages well over 300,000 cwt. Sisal, cultivated in the Nairobi district up to 7000 feet, usually provides the second most valuable export. Maize, grown at various elevations, yields a considerable surplus for export; its quality is good, and is subject to Government supervision. Research has developed excellent rust-resisting wheats, which are cultivated at about 7000 feet (chiefly in the Rift Valley), the crop being at present absorbed locally. Flax has been successfully grown at about 7000 to 7500 feet, but difficulties connected with retting and labour have caused its cultivation to languish. Among other matters concerning cultivation in the highlands, it may be noted that sugar and the banana can be grown at the lower elevations, while temperate fruits, as well as those known as 'Mediterranean,' have been successfully planted. The cultivation of tea of good quality is a promising recent

AFRICA

development, mainly on the west flank of the Mau Range, and there is some export. Tobacco, on the other hand, makes little progress. Successful attempts to add to the crops being grown are indicated by the increasing export of pyrethrum (insecticide powder made from a member of the daisy family) and the production of passion-fruit juice.

The native cow has been improved by European farmers by the introduction of pure-bred stock, and besides the supply of butter to the local market, there is a small export of this product. Cattle can for the most part be kept out of doors all the year round. The native sheep, of a poor variety, has been improved by the introduction of merino and other types, while horse-breeding is also carried on. Pigs are another introduction. One of the difficulties of stock-rearing is connected with the native carnivores, but this is lessening with closer settlement. It may be noted here that in Kenya and East Africa generally are found the chief present-day opportunities for big-game hunting. Strict regulations govern hunting; the licences issued are a source of revenue.

Mineral development has recently assumed substantial importance. Lake Magadi, 30 square miles in area, in the Rift Valley, is filled with carbonate of soda; transport costs are heavy, but there has been for many years a significant export. The discovery of gold (both alluvial and reef) at Kakamega in 1931 led to the alienation of a portion of the North Kavirondo native reserve, greatly disturbing native opinion. There has been a survey of the Nyanza province, and an increasing amount of gold (88,000 fine ounces in 1938) has been won—mainly by reef-mining.

The development of the colony along the present lines is bound up with two problems: labour and communications. The planters need a large supply of native labour, but the natives have shown little desire to abandon their traditional occupations. Various methods have been adopted to induce a flow of natives to the areas developed by the whites, and the system of 'forced labour' for public works commonly found in tropical territories is in operation. Attempts to increase the production of the native farmers are hindered by the fact that the native areas are, broadly speaking,

EAST AFRICA

untouched by the railway and include the very large arid area of the colony; moreover, the native population, while generally increasing slowly, is in some areas on the decrease, partly owing to disease and partly owing to the removal of many young men from their villages and the consequent interference with the traditional tribal life. The increasing use of motor-tractors and motor-vehicles renders the settler somewhat less dependent upon native labour.

Towns and Communications. Mombasa is on the east side

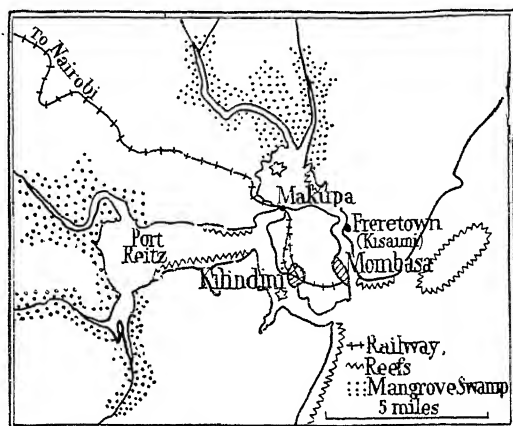


FIG. 86. MOMBASA ISLAND

The railway crosses a narrow channel at Makupa.

of the island (53,000 inhabitants) of the same name, and was for some time the chief Portuguese base in East Africa. Its harbour is frequented by small steamers and dhows. On the south-west side of the island is Kilindini, a splendid natural deep-water harbour, now provided with modern shipping facilities and reputed the finest harbour in East Africa. Apart from a considerable *entrepôt* trade, it serves as the great outlet and inlet for Uganda and Kenya Colony, as the Kenya and Uganda Railway runs from here through the most developed areas. The line runs through Voi, a junction for the Kilima Njaro district of Tanganyika Territory, and Magadi (the junction for a short and tortuous line

AFRICA

to the Magadi soda lake) to Nairobi (population, 60,000), the chief centre of white settlement, whence a branch runs to the foot of Mount Kenya. Nairobi is the administrative centre, from which many roads radiate, including one to the Sudan; it contains about a third of both the white and Indian populations of the colony. Beyond, the Rift Valley is crossed, and at Nakuru the line now branches, one route going to the lake port of Kisumu and the other through Eldoret to link up with the old Busoga Railway (see Fig. 85). In addition there are various short branches either existing or under construction. Away from the railway there are no places of importance.

Trade of Kenya and Uganda. The figures are for the domestic trade.

—	1936	1937	1938
Imports (£1000) .	6,872	9,843	8,005
Exports (£1000) .	8,355	9,657	8,505

The export figures fluctuate with the price level (low for staple products in 1938), while locust infestation may affect in particular the maize export. The leading import is cotton piece goods (£1 million in 1938, and including a considerable increase, common to the imports of these goods into most parts of Africa, in the share from Japan). Iron and steel goods, machinery, automobiles, motor spirit, apparel, tobacco, grain and flour, and whisky were other items (in that order). Cotton is normally the leading export (£3½ million in 1938, 97 per cent. from Uganda); it was followed by coffee (£1 million, three-quarters from Kenya), and by gold (£665,000, four-fifths from Kenya), tea from Kenya, sisal (almost entirely from Kenya), oil-seeds, hides and skins, maize from Kenya, sugar, pyrethrum, sodium carbonate (£113,000), in descending order. The United Kingdom does about 35 per cent. of the trade, sending rather more than receiving.

EAST AFRICA

TANGANYIKA TERRITORY

This area is a British mandate (Class B) and, except for a region round Lake Kivu mandated to Belgium, covers the whole of the former German protectorate of East Africa. The area is about 360,000 square miles, including 20,000 square miles of water; the population consists of about 5,140,000 natives, 9100 Europeans (including more than one-third Germans and a number of South African Dutch, notably in the Arusha district), 23,500 British Indians, 7000 Arabs, and a few thousand others. The density of population varies from more than 100 to the square mile in the district north-west of Lake Nyasa to 1.7 per square mile in the Masai district. About 3200 square miles of land are alienated, chiefly to Europeans, but partly to Indians. The mandate safeguards the interests of the native population, and in practice the administration is similar to that of the West African territories.

The regions represented in Kenya are repeated in this territory, but the proportion of purely arid country on the one hand is much less, while on the other the amount of highland suited to white settlement is also less; moreover, the latter type of country is more scattered. A very large proportion of the whites are settled in the districts adjacent to the Pangani river, which rises in Mount Meru and passes the foot of Mount Kilima Njaro; this area received most attention from the Germans, and is served by a railway from Tanga. The plantation activity owes a great deal to German research and initiative. The Central Railway, unlike the Kenya and Uganda Railway, does not tap a large area of white settlement, but passes for the most part through a savanna region that varies from park-land to thorny scrub. The highlands of the south-west are very much isolated, and white settlement in the Livingstone Mountains (Tukuyu highlands) and in the Iringa district has consequently made little progress at present; white settlers, however, are more and more turning their attention to the latter area.

Productions. The distribution of products follows very

AFRICA

much that of Kenya. The coastal and highland forests cover about 1 per cent. of the area; the coastal forests provide mangrove, ebony, gum copal, and wild rubber, and bamboo is common on the highlands. Coastal products include coconuts, rice, sugar, and cotton; the lower plateau is largely pastoral, typical products being hides and ghee; highland products include sisal and coffee. By the lakes coffee, cotton, rice, and sugar appear again. The most productive cotton area at present is the Mwanza Province, where the conditions are similar to those of Uganda; nevertheless, the results have been rather fluctuating, as the natives do not concentrate upon it as they do in Uganda. Very good quality cotton is grown in the Rufiji valley and along the Central Railway. Native cultivation includes food-crops such as beans, maize, and millet, oil-seeds, chiefly ground-nuts and simsim, and on the coast rice, cassava, and fruits like the banana, mango, and coconut. Native coffee of the *robusta* type and poorer quality forms the bulk of the Territory's coffee production; it is chiefly grown in the Bukoba district. White plantations of sisal (of which Tanganyika is the chief East African producer) are widely developed in suitable districts in the Pangani basin and farther south in the Morogoro and Lindi districts; the export has rapidly risen, and reached 100,000 tons in 1938. Coffee (*arabica*, of good quality) has become important in European plantations on the highlands of the Pangani basin, especially in the Lushoto area, while tea-planting has begun in this and other districts. There are cotton plantations in the coastal districts south of Dar es Salaam, and some attention has been given to sugar, coconuts, tobacco, cocoa, kapok, and spices. The Germans planted a large area with Ceará rubber, but there is no production to-day, and many estates have been given over to sisal. It is noteworthy that the oil-palm appears near Lake Tanganyika and that the Arabs have long cultivated the date in the Tabora district.

Stock-rearing by white settlers has not made as much progress in Tanganyika as it has in Kenya, but efforts are being made to improve the native cattle and to eliminate *nagana* and rinderpest. There are nearly 5 million cattle—

AFRICA

has greatly increased. Tin ore output from the Bukoba district has also advanced. Of many other minerals known to exist few are of note owing to difficulties of exploitation. Some good-quality mica is produced, and substantial quantities of salt—the latter chiefly along the coast.

Towns and Communications. Dar es Salaam has a central position, and is the best harbour on the coast. It is an old Arab settlement with a modern European section, having 35,000 inhabitants; it is the terminus of the Central Railway and the administrative centre; it exports principally copra, cotton, and ground-nuts. It has taken much *entrepôt* trade from Zanzibar, and formerly exported much copper from the Belgian Congo. The railway (metre gauge) runs up through Morogoro, a leading centre of native cotton-growing, and Dodoma to Tabora (7000 inhabitants), situated at the crossing of the old north-to-south and east-to-west caravan routes, and finally reaches Kigoma, on Lake Tanganyika. Kigoma, having a better harbour, has displaced the old Arab slave-centre of Ujiji. Tanga (16,000 inhabitants), exporting chiefly sisal and coffee, is the outlet of the important plantations of the north-east corner; its railway, the Usambara Railway, runs to Moshi and Arusha, the chief white centres, and has a strategic connexion with Voi on the Uganda line. Mohoro, near the Rufiji delta, is an outlet for mangrove poles, sugar, and cotton; nearly opposite is Mafia Island, rich in coconut-palms. Lindi, exporting coffee, cotton, and simsim, is served by a narrow-gauge tramway. The north-west of the territory has to export either *via* Lake Victoria and the Kenya and Uganda Railway, or by the line from Mwanza, on Lake Victoria, to Tabora and the coast. Bukoba collects the native-grown coffee of the district, and Mwanza deals chiefly in cotton, hides, and ground-nuts. Another branch runs from Manyoni to Singida, in a gold-producing area.

The Central Railway does a good deal of transit trade—both ways—for the Eastern Belgian Congo; this has declined (see pp. 223–224). Coffee from the Lake Kivu district goes out by this route.

The development of Kenya and that of Tanganyika Territory have followed similar lines, and the problems of

EAST AFRICA

the two areas are almost identical. The possibilities of white settlement are, however, more limited in Tanganyika, but for this reason, and because of its political status, there has been a greater stimulus to the improvement of the native farming in this area. Serious difficulties at present are connected with the spread of the infected tsetse fly in the interior districts (rendering them unsuitable for native occupation), locust invasions, and soil erosion.

Trade. Low prices for staple products seriously affected the 1938 export figures. The figures exclude bullion, specie, re-export, and transit trade. Goods in transit were valued at £2½ millions in 1929, at less than £½ million in 1931, and only £53,000 in 1938.

—	1936	1937	1938
Imports (£1000) .	3.357	3.924	3.450
Exports (£1000) .	4.516	4.969	3.707

Cotton piece goods form the principal import (£600,000 in 1938); foodstuffs, including sugar, are large items, as are iron and steel goods, machinery, building materials, oil, automobiles, and tobacco. Sisal accounts for some 40 per cent. of the export values (£1,425,000 in 1938; a great drop in value, though an increase in quantity); gold came next at £860,000, followed by coffee (£385,000), cotton (£380,000), hides and skins, rice, ghee, beeswax, tin, simsim, copra, and ground-nuts (£31,000). Ground-nuts are usually much more important.

ZANZIBAR

This alluvial and coralline island, 640 square miles in extent, lies a few degrees south of the equator, and is separated from the mainland by a channel 22 miles across at its narrowest part. With Pemba (380 square miles) it is a British protectorate, under the nominal rule of a sultan. The total population is about 243,000, mainly Swahilis, but there are 33,400 Arabs, 14,300 Indians, and fewer than 300 whites.

AFRICA

Productions. These fertile tropical islands are intensively cultivated. Moreover, Zanzibar has been for several centuries the principal Arab trading-station on this coast and a great port for the whole of East Africa. Hence the explanation of its very mixed population. Its present Arab and Indian population constitutes a big trading element. Many kinds of fruit are grown, but the important cultivations are cloves and coconuts, the former being much more valuable than the latter.

These islands produce the bulk of the world's supply of cloves. The clove industry first became important about a century ago, when the reigning sultan promoted it. A violent cyclone destroyed most of Zanzibar's plantations in 1872, and, though they have largely been re-established, Pemba leads to-day with about 40,000 acres under cloves as against 20,000 acres in Zanzibar. There is a certain amount of competition, especially from Madagascar.

There are some small industries, including soap-making, but the former export trade in soap has almost disappeared.

Zanzibar town (45,000 inhabitants) is opposite the mainland; it provides an extensive and sheltered anchorage. It has long been the largest city of East Africa, is visited by much shipping, and has a busy dhow traffic. Its importance as a trans-shipment centre has seriously declined in relation to the mainland, but while it can hardly hope to maintain its outstanding importance on this coast, there is little indication that its domestic trade will be seriously affected. It is an important cable-station.

Trade. An analysis of the trade of Zanzibar provides an interesting study of an old-established *entrepôt*.

—	1937	1938
Total imports . .	£1,230,000	£994,000
Total exports . .	£874,000	£845,000

Seeing that the value of the exports of domestic produce, principally cloves and copra, totalled only £663,000 in

EAST AFRICA

1937 and £640,000 in 1938, it is clear that there is a large additional trade of an *entrepôt* character. The principal articles of *entrepôt* trade are cotton piece goods, copra, petroleum, and ivory. Zanzibar collects copra and ivory from mainland centres, and distributes cotton goods and petroleum to them.

The other imports were mainly rice, sugar, flour, ghee, tobacco, bags, and coal. Of the exports cloves led at £515,000 in 1938, and, in addition to the items already indicated, there were exports of clove-stems and -oil and coconut-oil.

The cloves go now chiefly to the Dutch East Indies, India, and the United States; formerly they went largely to London, but other countries are now buying direct from Zanzibar. The imported copra is largely used for bulking with the local product, which is chiefly grown in Zanzibar, and is inferior in quality to that from Tanganyika. Of the imports, the United Kingdom, Japan, Burma, India, and Tanganyika Territory are important suppliers. India sends chiefly cotton goods and sacks, and Burma sends rice. Tanganyika Territory sends mainly copra, simsim, and ivory, and takes cotton piece goods and motor-spirit and petroleum. Most of the copra goes to France and Italy.

Tanganyika Territory takes more than half the re-exports, which have, however, greatly declined in recent years, showing the effect of competition from mainland ports.¹

¹ *Africa View*, by Julian Huxley, gives an admirable descriptive account of East Africa, together with a discussion of many of the problems which arise there and which are common to most of the white-administered areas of inter-tropical Africa.

CHAPTER IX

ISLANDS OF THE INDIAN OCEAN

MADAGASCAR

THIS is one of the large islands of the world, and lies between 12° S. and 25° S. latitude. It is 980 miles long, with a maximum width of 360 miles, and has an area of nearly a quarter of a million square miles. The population is about 3,800,000, of whom 25,000 are French, while there are some 14,000 Arabs, Indians, and Chinese. The Malagasy are largely of Malayo-Polynesian stock, but there has been intermarriage with negro peoples, and in the west and south are tribes of almost unmixed African origin. The dominant tribe is the Hova, numbering nearly a million, and their Malayan language (Malagasy) is in general use in the island; this Malayan people and the Betsileo, of mixed blood, are two vigorous types, and occupy the greater part of the plateau. There are a considerable number of French colonists, as well as creole¹ immigrants from Réunion and Mauritius. The Asiatics are chiefly traders.

The interest of the French in the island began with the rise of the East Indian trade, when Madagascar was used as a calling-station; they thus avoided African ports used by the traders of other countries. Actual conquest commenced in the north-west, where they claimed territory as having been ceded by local chiefs. Fighting with the Hovas took place between 1882 and 1885, following which the French assumed control over the foreign relations of the island; after further fighting Madagascar became a French colony in 1896. It is physically related to the mainland—from which it is separated by the Mozambique Channel, with a minimum width of 240 miles—but has few economic

¹A creole is a person of European descent born in the tropics, notably the East and West Indies; in this area they are mostly of French origin.

ISLANDS OF THE INDIAN OCEAN

connexions with it, and, in addition, has many characteristics that sharply distinguish it, particularly in regard to the origin of the population, the flora, and the fauna. Nevertheless, it offers a study in tropical development with distinct similarities to certain other divisions of the continent.

Physical Conditions. A coastal plain—fairly broad in the west and either non-existent or very narrow in the east—rises sharply, especially in the east, to a central dissected plateau with a general altitude of between 3000 and 4000 feet, but with outstanding ridges and massifs that lie relatively near the east coast and form the north-to-south watershed of the island. The highest part is towards the north, the Tsaratanana massif reaching 9450 feet. More extensive, though less high, is the massif of Ankaratra, a volcanic area reaching 8575 feet, situated south of Antananarivo. On the eastern side gorges have been cut by torrential rivers, the chief of which is the Mangoro; on the west the rivers have less steep gradients, and pass through gently sloping plains, although there are evidences of a broken ridge lower than, and parallel to, the main plateau. The Betsiboka, Mangoky, and Onilahy are among the more important of the streams draining to the Mozambique Channel; they have some value for navigation, especially in the summer. The plateau falls fairly gently to a coast plain in the south.

Geologically Madagascar is an outlying portion of the South African plateau. The central highland and its eastern flank consist of Archæan rocks, gneiss, granite, and schists. To the east are rocks of Cretaceous age, with a band of recent deposits extending from Fort Dauphin to Tamatave. There are recent deposits, too, round Lake Alaotra, which has an area of 80 square miles. The western plains are of sedimentary rock, becoming younger from Permian to Tertiary between the highlands and the sea. Archæan rocks cover, however, two-thirds of the area, and most of the exposed igneous rock has been decomposed into laterite. Old cones and lava-flows are widespread, but although earthquake shocks are felt from time to time the only remaining

AFRICA

evidence of active vulcanism is the frequent occurrence of hot springs.

The east coast is remarkably straight for a great part of its length; there is a long string of lagoons here, now connected by the Canaux des Pangalanes, which run for several hundred miles south from Tamatave. Natural harbours are few along this coast, but in the north Diego Suarez can accommodate large vessels, while the west coast has a number of good estuaries, including the bays of Ampasindova and Bombetoki, as well as a good harbour at Tuléar.

Climate and Vegetation. Most of Madagascar lies north of the Tropic of Capricorn, and the island is consequently in the belt of the south-east trades. Broadly speaking, mean sea-level temperatures decrease from north to south. The highest mean monthly temperatures range from a little above 80° F. in the north to a little below that figure in the south, while for the coolest month the figures are from 73° F. in the north to 68° F. in the south. But there are considerable differences in the daily range of temperature, which varies with the character of the rainfall and with the elevation. Thus high daily ranges are common on the west and south-west, where the climate tends to aridity; and on the plateau in the dry season minimum temperatures approximate to freezing-point. The effect of elevation on mean temperatures is shown by Antananarivo at 4600 feet, ranging from 58° F. to 70° F., as compared with Tamatave (68·5° F. to 80·5° F.).

The rainfall is naturally heaviest on the eastern seaboard and plateau slopes, and comes mainly in the southern summer. At this season the plateau has plentiful precipitation; the western plains, however, receive only a small amount of this largely convectional rainfall, except toward the north, where the lowlands for a considerable distance north and south of Mayunga have a large amount. The south and south-west coasts receive only a moderate to scanty share of the summer rainfall, and here summer temperatures are very high. In the southern winter only the east coast and eastern slopes have any substantial precipitation, and this is considerably less than the amount which falls in summer.

ISLANDS OF THE INDIAN OCEAN

Destructive tropical cyclones chiefly affect the east coast, and are most numerous in the summer months.

There are five climatic zones:

(1) *The Northern Tip.* Hot and wet from November to April; less hot and much less wet for the rest of the year.

(2) *The Eastern Zone.* Hot and wet; rain all through the year, heaviest in summer. Tamatave has 131", though the month of least rainfall, November (3.9"), just precedes the heavy rains. March has nearly 18".

(3) *The Western Plains.* Hot and wet in summer, with rainfall decreasing southward; dry in winter.

(4) *The South and South-west Coasts.* Relatively dry and hot, the small rainfall—in places as low as 16"—coming in the summer; the winter is dry and very warm.

(5) *The Plateau.* Warm-temperate in character, with summer rain. Antananarivo has a mean annual temperature of 65° F., an annual range of 12° F., and 54" of rain, of which only 2" falls between May and September inclusive. Large daily ranges during the dry season.

The *natural vegetation* closely follows the climatic zones. The eastern wet zone has dense forests containing ebony, rosewood, rubber, copal, the raffia-palm, and numerous species characteristic of hot, wet forest. A more temperate type of forest, with much bamboo, ascends the eastern slopes of the highland. The western plains, with their dry season,

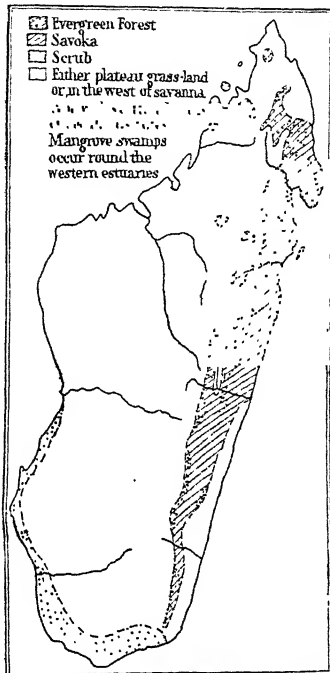


FIG. 88. MADAGASCAR—
VEGETATION

Adapted from a map described in "The
Geographical Teacher," Spring, 1923

AFRICA

have deciduous forests. Round the estuaries of the west coast mangrove swamps afford a useful source of tannin. The south and south-western coasts have semi-desert vegetation. The plateau, which has most of the population, is mainly grass-land, the tree-growth being limited by wind.

As in so many parts of tropical Africa, the forest has been seriously interfered with by native methods of cultivation, so that to-day it covers only 14 per cent. of the area of Madagascar. Forest is cut down, and the wood is burnt to provide a patch for cultivation. This is deserted and another patch cleared, the original clearing degenerating to a brush-wood type. Thus the forest descends to 'savoka,' and as 'savoka' is often afire, it sinks into bush. The laterite which is so often exposed in this way hardens under the influence of the sun to a crust that is useless to vegetation. The authorities are grappling with this serious problem.

The long separation of the island from the African mainland is illustrated by the fact that three-fourths of its species of plants are not represented there. The fauna illustrates this feature even more remarkably. The anthropoid apes and monkeys and the larger ungulates and carnivores of the mainland are absent, and rare forms of animal life, including lemurs and chameleons, are common, while the recent deposits contain remarkable fossils of relatively old forms, including giant birds and saurians. The reptiles resemble those of South America rather than those of Africa.

Productions. Before Madagascar became a French possession the external trade was very scanty. It is not, in comparison with the size of the island, very great yet.* Since then attention has been given to forest-products and forest-conservation, to the development of tropical agriculture (which has been greatly assisted by immigration from the Mascarene Islands), and to active agricultural research and encouragement, although the importance of pastoral occupations has not been neglected. The labour-supply is a difficulty; the island is relatively thinly peopled, and native methods of agriculture are primitive and wasteful, besides which the Malagasy are not easily diverted from their native

ISLANDS OF THE INDIAN OCEAN

food-production to plantation-work. The system of land-tenure has been altered to promote plantation development.

Wild products have relatively little importance. Mangrove-bark is obtained in the west; ebony and rosewood are found in the eastern forests up to an altitude of about 500 feet, and other useful timbers occur; the raffia-palm is widespread, though it is now cultivated; beeswax, honey, and gum copal are collected, but rubber-tapping has all but ceased. There is now a substantial export of raffia, and this product has considerable importance for local purposes.

The food-crops cultivated have in some cases become so important as to provide a surplus for export. Rice is by far the leading cereal, and is widely grown in deltas and places which can be irrigated; it is noteworthy that the two principal interior centres, Antananarivo and Fianarantsoa, are both situated on irrigated upland plains. There is now a substantial surplus of rice, while large plantations of manioc in the east and north-west permit an export of tapioca. A beginning has been made with the export of ground-nuts, for which cultivation the light soils of the west are admirably suited. One of the most widespread products is maize, the cultivation of which by the west coast has greatly expanded; another is Cape beans, of which there is a large crop in the western parts; haricots are widely grown on the plateau, and are exported with potatoes to Réunion and Mauritius. Cotton, tobacco, and sugar are all grown for local use. Market-gardening is carried on round the principal centres of the plateau, the chief European fruits and vegetables having been introduced.

Tropical agriculture, usually on European or creole plantations, is steadily proceeding. Coffee of the *robusta* type, notably in the Antananarivo area, is one of the most successful crops; clove cultivation on St Mary Island and the adjacent mainland has rapidly increased, and vanilla, introduced from Réunion, has become very important, though the quality is not yet high. Tobacco and sugar production have greatly increased, and considerable attention has been given to the growing of plants giving essences for perfumes, such as ylang-ylang and lemon grass. Tea and

AFRICA

cocoa have not met with much success, but deltaic areas of the north-west now carry coconut plantations, and there is already a small export of copra. The castor-oil plant is being grown in some of the drier parts, and developments in irrigation cotton are looked for in the south-west, where sisal is being cultivated in the Tuléar district. Mulberry-trees are grown in connexion with sericulture.

On the plateau stock-rearing is a staple occupation. The native cattle are of the zebu or humped type, and the native sheep are fat-tailed—that is, both are adapted to the dry season. Cattle are by far the more important, and there are more than 6,000,000 head; they are, however, of a poor type, and little progress has been made in improving the herds. The great problem is the shortage of food in the dry season, when many die of exposure on the plateau. Nevertheless, six of the larger towns, including the capital, Tamatave, Diego Suarez, and Mayunga, carry on meat-packing, and there is an export of animals to Réunion and Mauritius and a much more valuable export of hides. Sheep are not very numerous, and there are few goats. Pigs rank next to cattle as regards number, there being nearly half a million; a beginning has been made in the production of bacon and lard. Small numbers of asses, mules, horses, and ostriches are also reared.

Minerals. The mineral wealth is sufficiently well known and exploited to have considerable importance. The Archæan rock contains a large variety of minerals. Alluvial gold is worked in the north, but the output has considerably declined in recent years. Iron, copper, nickel, and lead ores are known to exist. Bauxite and graphite are widespread in the lateritized areas; the latter mineral has considerable importance, but the output has remarkably fluctuated, largely owing to labour difficulties. It is easily worked, and production began in 1909, reaching a maximum of 35,000 tons in 1917; since then it has been as low as 4000 tons, but has latterly risen (14,400 tons in 1938), rivalling the output of Ceylon. The mica output has also fluctuated; recently it has been small. Considerable future importance is attached to the deposits of coal in the upper Onilahy valley.

ISLANDS OF THE INDIAN OCEAN

Communications and Towns. Many crafts are practised, such as the weaving of cotton, silk, hemp, raffia, and other fibres, but there is little industrial activity in Madagascar. A good deal of labour is employed in connexion with the preparation of primary products—*e.g.*, sugar and tapioca—and in mining, in regard to the development of which there is available plentiful water-power. The meat-packing industry has already been referred to (p. 258). Labour is seriously short for the developments that are hoped for. Portage is still largely necessary, although there are now some 2000 miles of good roads, principally connecting more important towns, and another 12,000 miles of roads suitable for dry-season motor traffic. Certain rivers, particularly in the west, have considerable local value, and the Canaux des Pangalanes, connecting the east coast lagoons, providing a waterway 420 miles long, is of great importance for coastal traffic and for serving the developing valleys of the east. Railway communications are very limited.

The principal railway runs from Tamatave (21,500 inhabitants), the leading port, with a harbour somewhat protected by banks of coral, along the coast to Brickaville, and then climbs to the first step of the plateau at Moramanga (3000'), a centre for forestry, manioc, and graphite, and the junction for a branch to Andreba, on Lake Alaotra, in a rice-growing area.

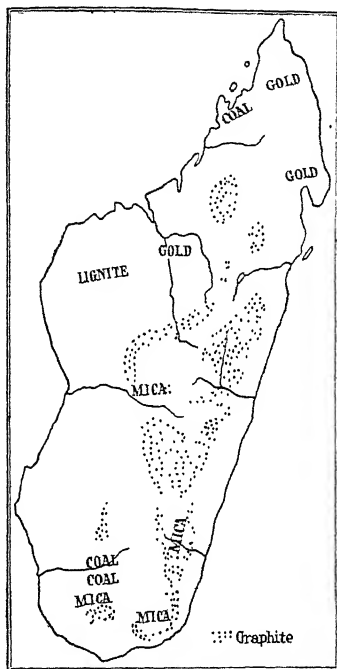


FIG. 89. MADAGASCAR—
MINERALS

ISLANDS OF THE INDIAN OCEAN

has been completed between the latter place and Manakara, which is likely to increase in importance in consequence; like Mananjary (12,000 inhabitants), some distance to the north, it serves both coastal and plateau districts. The second port in importance is Mayunga (24,000 inhabitants), in an area of active tropical development. A railway is projected from Tuléar up the Onilahy valley; much is expected from this line, for not only is the valley very fertile and capable of irrigation, already producing rice, cotton, and sisal, but the railway will serve a promising coalfield. The harbour is well protected by a coral reef, and may become the most important in the island. Diego Suarez (13,000 inhabitants), in the extreme north, and Vohémar can both accommodate large vessels; the former is a naval station and port of call. It should be noted that most of the ports are at or near the mouths of rivers; the more important ones are being modernized.

Trade. The trade has steadily increased in recent years, largely as a result of increased production. Imports in 1938 reached £3,550,000 and exports £4,825,000. Cotton goods are the biggest import (£1,100,000 in 1938), oil, machinery, iron and steel goods, and automobiles being other large items.

The leading export in recent years has been coffee, which reached £1¼ millions in 1938, followed, in descending order of value, by vanilla (£400,000), canned meat, hides and skins, sugar, cloves, raffia, manioc, mica, and graphite (£100,000). The exports also included rum, rice, tapioca, mica, and sisal, and illustrate the very varied economic activity. The bulk of the trade is with France.

MAYOTTE AND THE COMORO ISLANDS

This archipelago, lying in the Mozambique Channel, forms a dependency of Madagascar, and consists chiefly of four islands, with a total area of 800 square miles and a total population of 130,000, including rather fewer than

AFRICA

1000 whites. The principal island is Great Comoro. The group, hilly, and of volcanic origin, has a tropical wet climate, and is washed by the warm Mozambique Current. The natural forest has been largely cleared for tropical plantation. Sugar, though still important, has considerably declined in recent years; rum is distilled from molasses. Vanilla has assumed more importance than sugar, while ylang-ylang, cocoa, and coconuts are cultivated, and cattle are reared on the higher parts. These are the chief products, and, with hard timber, provide the exports; the trade returns are included in those of Madagascar. With the decline of sugar cultivation there has been considerable emigration to that island and the adjacent coast of South Africa.

The island of **Juan de Nova**, in the middle of the Mozambique Channel, produces small quantities of phosphates.

THE MASCARENE ISLANDS

Though doubtless known earlier to the Arabs, this group was discovered in 1507 by the Portuguese, from one of whom the name is derived. The islands are of volcanic origin, and cap a submarine ridge lying from 400 to 500 miles east of Madagascar, in about 20° S. latitude. The climate is hot, though not excessively so, with a small range of temperature and with a good rainfall, chiefly in summer, from the south-east trades. Destructive hurricanes are common, and occur mostly in the wet season. Réunion has a greater elevation than Mauritius. The group includes the isolated island of Rodriguez, lying to the east. The natural vegetation is forest, but this has largely disappeared. The indigenous flora and fauna show even less resemblance to those of Africa than do those of Madagascar. Emigration from these islands to Madagascar has been of great importance in connexion with the development of the latter.

Réunion

Originally called Bourbon, this island has been French since 1664. It covers barely 1000 square miles, and has a

ISLANDS OF THE INDIAN OCEAN

population of 210,000, chiefly *créoles bournonnais*.¹ There are a few hundred British Indians and some Chinese, negroes, and Malagasy. The island has a surf-bound coast, and is entirely volcanic; it is of much greater elevation than Mauritius, and a maximum height of over 10,000 feet is reached in the Piton des Neiges, in the north-west. Active volcanism continues in the south-east, where there was a

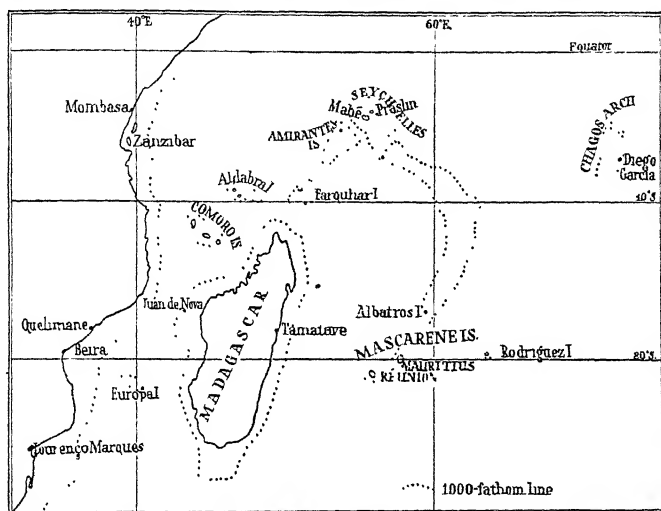


FIG. 91. ISLANDS OF THE INDIAN OCEAN

serious outbreak in 1927 in the neighbourhood of the Piton de la Fournaise (8200 feet). As in Mauritius, the mean annual temperature is about 78° F.; the rainfall, coming chiefly in summer, is very heavy on the higher parts. The lower areas are often unhealthy and swampy. There are still 150,000 acres of forest. In the early colonial days the island was chiefly important for its coffee plantations, but last century saw the substitution of sugar as the staple crop. Sugar covers some 60,000 acres, a quarter of the total cultivated area. The sugar crop is much smaller than that of Mauritius, there being little Asiatic labour in the island;

¹ Descendants of early French settlers.

AFRICA

moreover, the competition of beet has been seriously felt, so that the yield of sugar by 1920 declined to about 40,000 tons per annum, but has since greatly increased, reaching nearly 80,000 tons in 1938. Large quantities of rum are distilled. Vanilla is a relatively recent but important cultivation, and there are considerable areas under maize, tobacco, manioc, and coffee. Cloves and perfumes are also produced.

The chief port is Pointe des Galets, near the town of St Paul (21,500 inhabitants), on the north-west coast; it has a good sheltered harbour, the only one suitable for large vessels. The towns are necessarily scattered in the relatively small areas of lowland round the coast. The capital is St Denis, in the north, with 31,000 inhabitants; St Benoît is in the north-east and St Pierre (18,000 inhabitants) in the south-west. These towns are connected by 80 miles of railway. There is cable connexion with Tamatave and Mauritius.

The imports in 1938 totalled about £1,500,000, and consisted chiefly of rice and foodstuffs from India and Madagascar and manufactured goods from France. The exports were valued at about £1,200,000, and principally consisted of sugar and rum and small quantities of spices and coffee.

Mauritius

This island, originally called Cerne by the Portuguese, was occupied in 1598 by the Dutch, who gave it its present name. Owing to the failure of their settlement, the Dutch deserted it in 1710, leaving many marooned slaves. In 1715 the French occupied it under the name of Ile de France. During the Napoleonic Wars it became a base for privateers, but surrendered to the British in 1810. It has an area of 720 square miles and a population of about 415,000. About two-thirds of the population consists of Indians largely brought here for plantation work; most of the remainder are creoles and negroes, and there are nearly 8000 Chinese. The island is largely fringed with coral reefs; most of the interior is highland, the maximum elevation being the Piton de la Rivière Noire (2711 feet), in the south-west. The heavy

ISLANDS OF THE INDIAN OCEAN

rainfall on the highlands, coming chiefly in summer, and reaching 150" on the highest parts, has a rapid run-off, owing to the clearing of forests (which once contained a good deal of ebony), so that the lowlands are swampy and malarial.

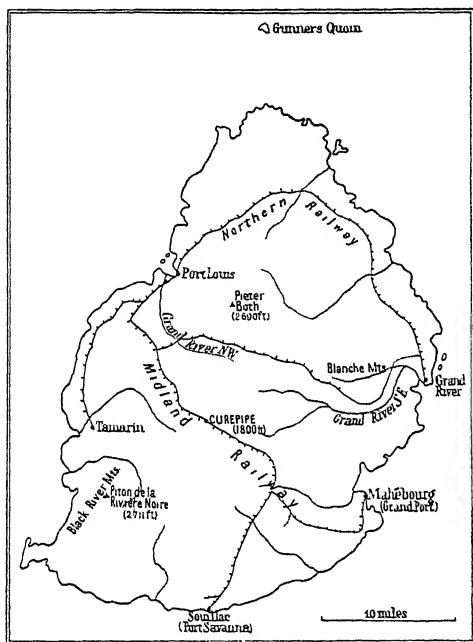


FIG. 92. MAURITIUS

Malaria is still a serious problem, though less so than formerly. There are considerable modifications of both temperature and rainfall due to relief; the rainfall notably varies from place to place and from year to year.

There is a remarkable development of the sugar industry, which was established here nearly two centuries ago with the assistance of negro labour; so dominant is this crop that it normally provides more than 80 per cent. of the export values; the production varies from year to year, being somewhat dependent upon the weather and upon the

AFRICA

depredations of a beetle pest. Indians own and cultivate more than half the sugar area, and the annual crop has recently exceeded 300,000 tons. The cultivation of coconuts, tobacco, vanilla, bananas, ground-nuts, pineapples, tea, and food-crops such as rice and maize is as yet very limited, but more attention is now being directed to crops other than sugar, as food and other necessities must be mainly imported. Mauritius hemp, derived from an aloe, grows wild, but it suffers from the competition of Manila hemp and sisal, and the production is now small. It should be possible to develop a variety of irrigation crops, since the lowlands have a relatively small rainfall and a definitely dry season. An irrigation scheme in the south-west subserves sugar-growing. Cattle are reared largely for draught purposes, and there is a small export of hides.

Mauritius has two good harbours, Port Louis and Grand Port. The latter, with the town of Mahébourg, is little used, being exposed to the prevailing wind. Port Louis, with 57,000 inhabitants, is on the north-west and sheltered side of the island, and is protected on the land side by highlands. Here is concentrated most of the trade, but as the town is unhealthy a residential capital has grown up at Curepipe (19,500 inhabitants), in the interior, at 1800 feet. Souillac (Port Savanna) is a picturesque seaside resort. The island has 144 miles of railway, mostly of standard gauge. Mauritius is a cable-station and a place of call for some vessels using the Cape route to India.

The following figures are based upon the value of the rupee as 1s. 6d. Imports in 1938 were valued at £2,550,000, exports at £2,500,000. The chief import is rice from Burma; other foodstuffs, cotton goods (largely from Japan), fertilizers (chiefly sulphate of ammonia), machinery, iron and steel goods, and oil are other considerable items. In 1938 the sugar export (chiefly to the United Kingdom) reached nearly £2,400,000, followed by copra (mostly from the Oil Islands—see p. 267) at £20,000. The export of Mauritius hemp (valued at £50,000 in 1927) has steadily fallen in recent years, and reached only £4,700.

ISLANDS OF THE INDIAN OCEAN

Rodriguez is a dependency of Mauritius, 350 miles to the east; it is a volcanic island rising to 1700 feet, with an area of 42 square miles and over 10,000 inhabitants, chiefly negroes. It is nearly surrounded by coral reefs. With a climate similar to that of Mauritius, though somewhat cooler, it grows citrus fruits, maize, and beans, and rears cattle and goats, while fishing has considerable importance. The total trade in 1938 amounted to £57,000.

The Chagos Archipelago is part of a group of islands known collectively as the Oil Islands. These are also dependencies of Mauritius, and are disconnected groups of atoll formation, lying but a short distance south of the equator in the middle of the Indian Ocean. The total population is barely 1600, and consists mainly of negroes and Malagasy. Coconuts provide a considerable export of oil and copra; guano and salted fish are also produced. The Chagos Archipelago contains the remarkable atoll of Diego Garcia, which encloses a lagoon 13 miles long from north to south and 4 to 6 miles wide. This is a useful coaling-station on the routes from the Red Sea to Western Australia and between Mauritius and Colombo. The lesser dependencies are of no particular importance; they include Trois Frères, St Brandon, and Six Islands.

THE SEYCHELLES

This British group, with dependencies, contains 92 islands, having an area of 156 square miles. The most important island is Mahé (56 square miles), the next largest being Praslin (20 square miles). The population numbers 31,500, and is mainly African in origin, but contains a large number of creoles and some Indians. The dependencies include the Amirantes, Aldabra, Providence, and Farquhar Islands.

The Seychelles are of granitic and volcanic formation, in some parts of considerable elevation, rising in Mahé to 3000 feet; they are surrounded by coral reefs. Being only a few degrees away from the equator, they have a climate which is remarkably equable, without excessive heat, and without the disastrous hurricanes that do so much damage nearer the Tropic of Capricorn. There is plentiful rain, due to the

AFRICA

north-west wind that blows from December to April. The south-east trades blow for the rest of the year. The forests include a certain amount of mangrove swamp. There are few domestic animals, but fishing, principally for tortoiseshell and trepang, has some importance. Communications are largely coastwise, but motor transport on the larger islands is increasing.

Apart from foodstuffs grown for local consumption—sugar, maize, manioc, bananas, and yams—cultivation is mainly concerned with coconuts and spices. On Praslin and Curieuse the *coco-de-mer*, or double coconut, is indigenous; it is found nowhere else in the world. There are some 28,000 acres under coconuts, the next important product being cinnamon. Vanilla (much declined in recent years) cloves, patchouli, and pineapples are also cultivated. The industries are chiefly connected with the drying of copra, the extraction of oils, the working of phosphates, and the collection of mangrove-bark.

Port Victoria, on the north-east of Mahé, is the capital; it has a good harbour, is a coaling-station, and is called at regularly by vessels running between Bombay and Mombasa. It has cable connexions with Mauritius, Zanzibar, Aden, and Colombo.

Imports (based on the value of the rupee as rs. 6*d.*) in 1938 totalled £80,000, made up principally of cotton goods, rice, and other foodstuffs. Exports were valued at £70,000; copra led at £40,000, followed by phosphates (£19,000), cinnamon oil (£13,500), and smaller values of patchouli and vanilla. Low prices mainly accounted for the fact that the value of the exports was less than half that of the previous year.

CHAPTER X

SOUTH AFRICA

GENERAL CONSIDERATIONS

THE large economic region of South Africa comprises a number of political divisions, with a total area of about 2,000,000 square miles and a total population of some seventeen millions, including about 2 million whites. Although stretching through many degrees of latitude (from roughly 10° S. to 35° S.), and therefore exhibiting diversities of climate, it has considerable uniformity of relief, as well as a large measure of economic and political unity. Except for Portuguese East Africa, the whole area is under British control. The dominant political unit is the Union of South Africa, which has, for Africa, a well-developed railway-system, linked with that of South-West Africa, a Union mandate, and through Bechuanaland with the railways of Rhodesia. The unification of Northern and Southern Rhodesia and their ultimate fusion with Nyasaland is being seriously discussed; this seems at the present time more likely than fusion with the Union of South Africa. The railway links of these northern territories are being improved, and the reason for placing Portuguese East Africa in this large economic division is the dependence of Nyasaland, Southern Rhodesia, and the Transvaal upon rail-communications with the Portuguese ports of Beira and Lourenço Marques. It should be further noted that in no other division of Africa has the exploitation of mineral wealth been of such outstanding importance or played such a dominant part in the historical and economic development. The whole region keeps official time two hours in advance of Greenwich, based upon longitude 30° E.

AFRICA

Physical Conditions. Apart from a rather considerable area of lowland in Portuguese East Africa, along the coast of which is a belt of recent alluvial deposits, South Africa shows the ancient plateau structure (with a higher bordering rim) so typical of the continent. The interior basin of Lake Ngami and the Makarikari Salt-pans and the Molopo basin are



FIG. 93. GRANITE KOPJE, SOUTHERN RHODESIA

These kopjes result from the erosion of the granite. They be distinguished from the flat-topped mountains and common farther south in South Africa. They are found in their neighbourhood.

High Commissioner for Southern Rhodesia

filled with recent alluvial and lacustrine deposits, bordered by Primary or ancient crystalline rocks. Important beds of Primary sandstone—for example, the Table Mountain Sandstone—and ancient conglomerates occur, especially in South-West Africa and in the Transvaal. In the central and eastern parts of the Cape Province and in the Orange Free State and Natal the rocks are mainly of Secondary age, and include the Stormberg beds with their coal-bearing formations. A great deal of faulting and some folding has

SOUTH AFRICA

taken place in the south and south-east, and the whole area has been subjected to prolonged denudation. In the interior, where relatively dry conditions prevail, the horizontal bedding of many of the rocks has led to the development of the flat-topped conical hills, often bordered at the top by precipitous cliffs, known as kopjes; in the formation of these wind has played an important part. In some parts, especially Rhodesia, kopjes of irregular outline arise from differential erosion in igneous rocks.

The average elevation of the plateau considerably exceeds 3000 feet, the principal areas not reaching this height being the Molopo basin, considerable regions round the Limpopo and Upper Zambezi, the Ngami depression, and the deep, unhealthy trench of the Loangwa. In addition, the Rift Valley, occupied by Lake Nyasa and the Shiré, is below this elevation. The western rim, which at places in South-West Africa exceeds 6000 feet, is broken by the Kunene and the Orange. The eastern rim contains the most prominent relief in South Africa—the long water-parting from the Storm Bergen in the east of the Cape Province to the Zoutpansbergen just south of the middle Limpopo. In the Drakensbergen, broad, flat-topped, and deeply dissected highlands, the highest points of Mont aux Sources and Cathkin Peak attain between 11,000 and 12,000 feet. Between the Limpopo and Zambezi lie the Matopo Hills and the highlands of Mashonaland, which on the eastern border of Southern Rhodesia exceed 6000 feet, but this elevation is reached, to the north of the Zambezi, only in the highlands bordering the Rift Valley. In the extreme south step-faulting has led to a terrace formation, with the feature-lines running east to west, the Little Karoo lying between the Lange Bergen and the Zwarte Bergen and the Great Karoo between the latter and the Nieuwveld Range. In the extreme south-west, however, the trend of the Olifants Mountains is from north to south.

The principal river is the Zambezi, which, having captured a good deal of the drainage formerly running to the Ngami depression, now derives many head-streams from the Bihé plateau. As a navigable waterway it is seriously impeded

AFRICA

by the Victoria Falls,¹ and again between Zumbo and Tété, while its lower course and delta are subject to serious floods and may be rendered difficult by a prolonged period of low water. It receives the Loangwa and the Shiré; the latter drains Lake Nyasa, a useful water area, with its surface at 1650 feet. The Limpopo, like its tributary the Olifants,

drains a considerable area on the inside of the eastern rim, but it is of little value for navigation, as its *régime*, like that of other South African rivers, involves little water in the winter season. South of this are many rivers which, assisted by a relatively high rainfall, are eating into the highland; such are the Tugela, Unzinkulu, Great Kei, and Great Fish rivers; while in the south are a number of rivers, including the Gamtoos and Gouritz, with well-developed longitudinal sections.

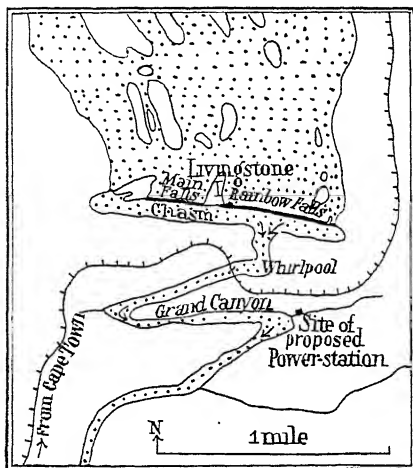


FIG. 94. THE VICTORIA FALLS

The gorge continues for forty miles, its course having been determined by well-marked joints in the basalt.

The Orange, although a striking feature of the map, has no great importance, and receives no permanent tributary below the junction of the Vaal; the Caledon is one of its more important tributaries. It rises in the Drakensbergen, and has many rapids along its course. It makes a final plunge of 400 feet below Upington, and loses much water by evaporation in its lower course.

With a plateau structure, and presenting a faulted edge to the sea, it is not surprising that South Africa as a whole has few good harbours. Most are only open roadsteads until

¹ 357 feet in height. The Zambezi here jumps over an outcrop of Tertiary basalt.

SOUTH AFRICA

artificially improved. Walvis and Saldanha Bays are good, but Table Bay has a bad reputation, as it is exposed to strong winds. Elsewhere the finest natural harbour is Delagoa Bay, and the island of Mozambique provides shelter along the swampy, reef-fringed coast of Portuguese East Africa. Numerous lagoons and creeks provide local navigation for small craft in the neighbourhood of Quelimane and Inhambane.

Lake Nyasa is the most important lake of the area ; it occupies the south-east of the Rift Valley, and its deepest part is nearly 700 feet below sea-level. Its water-level seems to be subject to periodic fluctuations ; in recent years it has been low, rendering the Shiré almost valueless for navigation. Lake Bangweolo is barely 20 feet in depth, and is surrounded by extensive swamps. Lake Ngami is, owing to interior desiccation and the capture of its water by the Zambezi, now only a swamp ; water struggles into it from the Cubango Marshes, and the Botletle, which may be quite a considerable stream in a wet season, carries water to the Makarikari Salt-pans. Numerous salt-pans or ' vleis ' dot the region between here and the Cape.

Climate. Broadly speaking, the climatic conditions vary from tropical in the north to warm temperate in the south, but as mean temperatures, except at the highest elevations, are nowhere low, the amount and distribution of the rainfall are of greater importance than the temperature conditions in determining the type of vegetation. The general factors affecting the climate are as follows :

(1) The west coast has much lower temperatures than the east, as it is affected by the cool Benguella Current, while the east feels the influence of the warm Mozambique Current, which, continuing as the Agulhas Current, sweeps down to the south coast. Swakopmund's highest and lowest mean monthly temperatures are 63·5° F. and 55° F., contrasting with Durban's 77° F. and 64·5° F. The cooling influence of the Benguella Current, however, is confined to the coast, and Windhoek, although at 5400 feet, has corresponding temperatures of 74·5° F. and 55·5° F. These currents, moreover, contribute to the comparative wetness of the east coast and

AFRICA

the extreme aridity of the west, where the cool water leads to frequent fogs, so that Walvis Bay, with less than an inch of rainfall, has a mean annual relative humidity of 84 per cent.

(2) Along the eastern margins the prevailing wind is the south-east trade. The high eastern barrier tends to concentrate the rainfall on the east coast; otherwise the general result is a gradually decreasing rainfall westward. Durban has 45", Bloemfontein 21", Upington 7.2", and Lüderitz Bay less than 1". This general effect is modified in several ways; toward the north a tropical influence causes heavier rainfall, especially where the relief is high, the highlands round Lake Nyasa receiving up to 100"; the eastern parts of both Northern and Southern Rhodesia have over 30", and even the north-east of South-West Africa has over 20". Again, in the Cape Town area, and for a considerable distance along the south coast, the influence of westerly cyclones in winter is a modifying factor.

(3) Most of the rainfall is in summer, when a high temperature over a considerable area in January results in the in-drawing of the south-east trade over the Mozambique Current. Although the east coast has a dry winter season, there is no entirely rainless month; going westward, however, into the region of diminishing rainfall, the length and severity of the winter drought increases. Pretoria receives an average total rainfall of less than 1" between May and July, months which are entirely rainless at Bulawayo and Livingstone. The region with a winter maximum of rainfall deserves special notice. Cape Town's annual total is nearly 25", of which more than 20" fall between April and October inclusive. These rainfall conditions continue along the coast to near Knysna, between which place and Port Elizabeth is a belt whose rainfall is unique in South Africa in being substantial in amount and well distributed throughout the year.

(4) The influence of aridity combined with high elevation is illustrated by the daily range of temperature. The interior has necessarily high maxima and very low minima, the former, of course, chiefly in summer and the latter in winter.

SOUTH AFRICA

Night frosts are common in the higher regions with a well-marked winter drought, and at Gobabis, in Eastern South-West Africa, as much as 17° F. of frost has been recorded. Even along the coast of South-West Africa minimum temperatures occasionally approach freezing-point.

(5) A feature of great economic importance is the irregularity of the rainfall over most of the area. It is characteristic of interior regions tending to aridity that the rainfall should be spasmodic and associated with thunderstorms, and that it should be unreliable. Thus at Windhoek the months of January and February, with a combined average rainfall of more than 6", have been known to be totally rainless. These conditions, which prevail over the greater part of the area, have a serious repercussion on farming; the maize crop, for example, fluctuates considerably from year to year.

Vegetation and Animals. The vegetation depends, broadly speaking, more upon the amount and distribution of the rainfall than upon differences of temperature. The proportion of forest is relatively limited, but there is a considerable area of woodland of a more open type. Mangrove swamps occur where rivers reach the Mozambique coast, which may be regarded as having a strip of tropical forest ascending the lower slopes of the plateau, though for a considerable distance north and south of Inhambane this coastal belt hardly exists. The belt of tropical growth ascends the Zambezi to the Victoria Falls, and the lower slopes of the Nyasaland highlands have a similar heavy vegetation cover. The coast forests of Mozambique continue southward in the sub-tropical 'palm-belt' of Natal, which is a response to the warmth and moisture derived from the Mozambique Current, and contains species of palms, stinkwood (a laurel), blackwood, lianes, and epiphytes typical of the more northerly strip.

With decreasing rainfall and a longer drought season combined with high elevation, the eastern forest thins out into savanna forest stretching into the interior of Mozambique and into the east of Rhodesia. The thorn and bush veld of the Union continues it southward. Trees are usually deciduous because of the winter drought, not large in size, and often with flattish crowns. Where elevation increases the

AFRICA

rainfall, and in moist valleys, the tree-growth may be more dense, but in the drier districts the proportion of more open country with grass increases, trees decrease in size, and drought-resisting shrubs become common, giving rise to a scrub type of vegetation. In Northern Rhodesia, toward the Congo divide, the amount of forest increases, and is denser in growth; this is a little-known territory which is now being explored by aerial survey. This type of vegetation continues in a less dense form into the north-east of South-West Africa, and is also found in the low veld by the Limpopo. Among the woodlands may be included the Mediterranean area of the Cape corner. Here the adaptation is to relative summer drought; trees tend to be stunted, with small, stiff, leathery leaves, and there is much scrubby growth, with a wealth of small flowering plants which are bright with colour when the rainy season begins in May.

This belt of woodland borders—on the north, east, and south—the more open savannas of Western Rhodesia and the temperate grass-land veld which prevails over a great part of the Transvaal and the Orange Free State. A grass cover predominates, and in areas with a longer drought season merges into the 'Kalahari grass-land' and the Karoo region. The latter may be regarded as semi-desert, and has a vegetation distinctly inferior to that of the former. The proportion of barren ground increases in Namaqualand, and finally the Namib Desert is reached, where only an insignificant and specialized growth of drought-resisting plants occurs.

It is not surprising that the typical animals are herbivorous and fleet-footed. Many species of antelope are native to South Africa, including the eland, hartebeest, gnu, and springbok. Many animals are practically extinct except in the more northerly areas; for example, the gnu, quagga, zebra, buffalo, and elephant, as well as the rhinoceros and hippopotamus. Carnivores include the lion (still found north of the Limpopo and in Zululand), the leopard, and the wild dog. Other animals of interest are several poisonous snakes, baboons, and monkeys, as well as wild ostriches in South-West Africa.

SOUTH AFRICA

Population and Races. The native population (which is often loosely referred to as Kafir) belongs mainly to the Bantu section of the negro race. There are, however, many tribes, varying widely in vigour and intelligence. Before Europeans entered the region the chief Bantu tribes were found in the north-east and east, and included the warlike Zulus, the related Matabele (now occupying Southern Rhodesia), the less vigorous Mashonas and Bechuanas, the Barotse of North-western Rhodesia, and the Hereros of South-West Africa. These are typical agriculturists and cattle-keepers, living in kraals, which vary somewhat in construction with the tribes. In addition there are the Hottentots and Bushmen. The Hottentots, a negroid Hamitic race of rather small stature—probably due to Bushman admixture—once covered a large part of Africa, but retired into the drier south-west before the advancing Bantu tribes from the north-east. The Bushmen, who seem to be aboriginal, are found chiefly in the driest parts; they have yellowish skins and woolly hair, are of small stature, and are nomadic hunters.

The Dutch settlement at Table Bay, dating from the middle of the seventeenth century, led to a gradual white penetration eastward and north-eastward. This penetration was limited in the north by arid conditions; by 1778 it had reached the Great Fish River, 450 miles east of Cape Town. The region came finally under British rule in 1814, and the discontented Dutch settlers, following Kafir wars, began the Great Trek in 1836. In the meantime a British settlement had been made at Algoa Bay (Port Elizabeth) and another at Port Natal (Durban). In the eastern interior the warlike Zulus had been steadily and ruthlessly extending their influence southward. The trekking Boers penetrated what is now the Orange Free State and the Transvaal, and reached Natal; they inevitably became involved in cruel wars with the Zulus, with whom the British in Natal subsequently came into conflict. Zulu domination was broken, but there were repercussions northward. The Boers in 1837 drove the Matabele north of the Limpopo; the latter decimated and enslaved the Mashonas of what is now Southern

AFRICA

Rhodesia, and later, when British authority spread into this region, the British South African Chartered Company came into conflict with the Matabele, which trouble finally terminated in 1898.

Although the British occupied Walvis Bay as early as 1796, there was little interest in this arid region until a German company obtained a concession from a Namaqua chief in 1883; eventually Bismarck was allowed to annex the whole area of what is now South-West Africa, with the exception of Walvis Bay, which remained British.

The more recent political history of this part of South Africa is mainly concerned with the armed conflicts between the British and the Boers, now happily overcome by the setting-up of the Union in 1910; the Union took over the mandate for South-West Africa after the Great War. The rise of the Rhodesias is also noteworthy.

The Portuguese had not troubled to settle in the extreme south; their nearest settlement was at Delagoa Bay. In this region and in Nyasaland the Bantu tribes suffered from the Arab slave-trade, in connexion with the suppression of which the British established their hold over what is now the Nyasaland Protectorate.

Development. The economic history of South Africa combines the two principles of settlement and exploitation, and there is a complex native problem, which takes somewhat different forms in different parts. The European everywhere depends upon coloured labour. In the Union the early settlers were farmers, and, so far as settlement in the veld was concerned, pastoral farmers. The discovery and exploitation of diamonds and gold had several very important effects; it was largely, if indirectly, responsible for the conflicts between the British and the Boers; it attracted many people to South Africa; it stimulated the development of railways in a region where the ox-wagon was the principal means of transport; it thereby stimulated and helped the farming industry, even if it led to the neglect of organized agricultural development; and it led to the recruitment of natives for work in the mines and hastened the break-up of traditional tribal life. The mineral wealth, it should be

SOUTH AFRICA

noted, includes coal in Southern Rhodesia, Mozambique, Natal, and the Transvaal, while diamonds and metals have promoted settlement in the arid south-west. The mineral exploitation has passed through Southern Rhodesia into Northern Rhodesia, both richly mineralized, where white settlers—farmers—have also found a native problem very similar to that of Kenya. This is less true of Nyasaland.



FIG. 95. BRICK HUTS OF NATIVE COMPOUND, WANKIE COALFIELD

These modern huts, built from local material, may be contrasted with the conical-roofed native huts seen in the background

High Commissioner for Southern Rhodesia

In some districts Asiatics have been involved; Chinese were once recruited for the Rand mines and Indians for Natal's plantations. The Arab element is prominent in Mozambique and the Indian in Natal, while a few descendants of Malay slaves brought from Madagascar are found in Cape Town.

The economic products which constitute the principal exports of this region are varied. Apart from minerals, they include maize—under the name of mealies this is the staple food over most of the area—which is grown particularly in the Transvaal, Natal, and Rhodesia, pastoral products, such as wool, mohair, hides, and skins, from the veld and the Karoo, tobacco, widely distributed in the wetter regions,

AFRICA

and showing a remarkable increase in the last few years,¹ fruit, tropical in the east and warm temperate elsewhere, and dependent largely on irrigation (for which the river *régime* and relief provide only limited opportunities), and tropical products, like sugar and sisal, in Mozambique, where conditions are similar to those of East Africa. Wheat is not, generally speaking, an important crop. A great deal of attention has been paid to cotton-growing, which is most important at present in Nyasaland. Active research in connexion with farming problems goes on in the Union and elsewhere, but the area where conditions for tropical agriculture are most favourable, Mozambique, is still in a state of very backward development.

The value of mineral exports far exceeds that of farming products. The latter are mainly the result of European introduction and experiment, and this is true equally of animal products. The native cattle are hardy, but of inferior quality. Broadly speaking, European breeds of cattle, sheep, and goats have been introduced with great success, and animal products have considerable importance. The tsetse fly is found in all the lower and moister areas of the north, and everywhere animals are subject to disease; horse-sickness, cattle-plague (rinderpest), tick-borne diseases, in connexion with which the dipping-tank has proved a great boon—these are common. In regard to crops, the variable rainfall is a most serious difficulty, while the locust may be very destructive. It is noteworthy that the fishing industry has little importance at present, but that whalers use South African ports.

The problem of developing an export trade is largely one of communications. There is a lack of navigable waterways, and good roads are still few, although increasing with the rapid development of motor-traffic. The name 'road' is often applied to what is little more than a cleared track, unusable in wet weather. The Union now has a relatively well-developed railway-system, and the great railway link of the area as a whole is the line from Cape Town through

¹ The production of tobacco has become so great that a difficulty has arisen in finding a market for the whole of this crop.

SOUTH AFRICA

Mafeking to Bulawayo, Livingstone, and the Upper Congo. A roughly parallel line is found through Bloemfontein, Johannesburg, and Pretoria to the Limpopo. These main lines have links to convenient ports in the east and south, and it is noteworthy that the ports of Mozambique are essential to the economic life of Southern Rhodesia and the Transvaal. Nyasaland and Northern Rhodesia are still awkwardly situated as regards their external relations; at present the railway link between the former and the port of Beira involves a break of bulk at the Zambezi.

Largely as the result of the policy of expansion for which the late Cecil Rhodes worked in the last quarter of the nineteenth century, the consolidation of this area as an integral portion of the British Empire has been achieved. British interests in Mozambique are considerable, and as a result of the Great War the former German South-West Africa was placed under the administration of the Union. Natives far outnumber Europeans in every political division, and it is difficult to foresee how the apparently conflicting interests of white and black will finally be solved. The problem is complicated by the different moral and religious standards and codes of European and African, and, now that tribal wars have ceased, by the greater rate of increase of the African as compared with the European population. In the area under British control native reserves are established, such as the Transkei Territories in the Cape Province, but these are now generally recognized to be inadequate. Not the least of the problems is the disintegrating effect upon tribal life and *moral* that arises when the native leaves the kraal for employment elsewhere. It should be noted that Basutoland and Swaziland, as well as the Bechuanaland Protectorate, are in effect native areas, but supervised through the office of the High Commissioner for South Africa.

MOZAMBIQUE

This territory, also called Portuguese East Africa, lies between the Rovuma in 11° S. and latitude 27° S. It covers an approximate area of 298,000 square miles. and has an

AFRICA

estimated population of rather more than four millions, including about 23,000 Europeans—largely in Lourenço Marques and Beira—and a similar number of Indians, Arabs, and coloured people. Until recently two chartered companies shared the administration with the Portuguese Governor-General; in 1929 the Government took over the territory of the Nyasa Company, leaving the Mozambique Company, in which there are large British interests, to develop and administer an area of 60,000 square miles, with nearly 400,000 people, lying between the Zambezi and latitude 22° S.¹ The western boundary reaches the eastern shore of Lake Nyasa and marches with Rhodesia and the Transvaal, with a long salient up the Zambezi to Zumbo.

Physical Features. There is a continuous strip of low coastal plain, of varying width, which extends up the Limpopo and the Zambezi. Tété, on the Zambezi, some 300 miles inland, is only 400 feet above sea-level. Elsewhere, however, the highland is soon reached, the greatest elevation (over 5000 feet) being found on both sides of Nyasaland and north and south of the railway running west from Beira. Already a number of Portuguese and British settlers have farms on these relatively temperate uplands. The lower courses of the rivers are available for navigation, especially in the summer, when, however, they suffer from floods and may be visited by disastrous cyclones. The Zambezi is unfortunately blocked above Tété by the Kebrabasa Rapids, some 50 miles in length. It is noteworthy how the river and valley route led to the spread of Portuguese influence westward in this part of Africa at an early date. The temperatures are tropical, though modified by elevation over large areas, with a small coastal range; the considerable summer rainfall is much heavier in the northern part. In winter there is a well-marked dry season from June to October.

Production. Development has been hindered until recent times partly by lack of interest and partly by trouble with the natives. But there are few areas in tropical Africa which offer such good soil, such a relatively reliable climate, and so few labour difficulties, either for plantation or mining work. Recent advances in East Africa have also stimulated interest

¹ The Company's concession expired in 1941.

SOUTH AFRICA

here. Development is now in the hands of large companies, and is on plantation lines; there is little encouragement given to the native to become a producer on his own account. Most tropical crops could be produced, and there is plentiful evidence of unexploited mineral wealth.

The coast swamps, especially in the neighbourhood of Beira, provide mangrove-bark, from which the extract (cutch) is now obtained in local factories. The principal forests are on the uplands, where hard timber resistant to the white ant is being worked. The forests also provide beeswax and wild rubber, but the collection of rubber, whether from the forests or from the few Ceará plantations, is of little importance. Small quantities of ivory are exported.

The natives cultivate maize, millet, ground-nuts, simsim, beans, rice, manioc, tobacco, and cotton, but these are mainly for their own needs; they do, however, supply large quantities of ground-nuts and a little simsim for export. An increase of maize-growing by Europeans is probable, as heavy crops are already being raised on the Manica Highlands. Tropical fruits—for example, bananas, citrons, and pine-apples—offer a promising future, and are being developed in the Lourenço Marques area. But the important plantation products at present are sugar, sisal, and copra. The heaviest sugar production is in the Lower Zambezi valley, while the Quelimane district is the chief area for sisal and copra, this district having coconut plantations with several million producing palms. The sisal comes chiefly from the districts north of the Zambezi, but the production is small in comparison with that of Tanganyika Territory. Cotton cultivation is receiving attention by the Zambezi and farther south, and a Limpopo irrigation scheme is planned in connexion with this and other crops; the cotton export at present is largely native-grown. Tobacco, coffee, kapok, and castor oil are other crops more or less in the experimental stage, coffee giving good results in the Inhambane district. A little tea is now being grown near the Nyasaland border.

Big game is plentiful, including the elephant. The only domestic animals of importance are cattle, which are not

AFRICA

very numerous, and are kept chiefly on the uplands owing to the prevalence of the tsetse fly in the lowlands. The dipping-tank has been introduced, as ticks are troublesome.

Minerals. At present there is great interest in mineral development. Ancient gold-workings, possibly prehistoric, are numerous, and this metal is worked in the Manica Highlands; iron, galena, graphite, mica, petroleum, and asbestos are all known to exist. The Tété district is, however, of special importance. Here is a rich coalfield near the surface, with seams up to 25 feet thick, and iron, copper, and other metals are known to exist in the neighbourhood. As this part of Africa develops the Tété coalfield will increase in importance, especially should Beira be connected with it by rail; the one colliery is at present producing a few thousand tons annually.

Other Economic Activities. Among minor activities may be mentioned the factories associated with such products as cotton, sisal, and copra, and the obtaining of salt by evaporation of sea-water in the neighbourhood of Mozambique. Here, too, a small fishing industry may become important if the hinterland markets of Rhodesia and the Transvaal become accessible.

Ports. A number of ports have already been mentioned, but Beira (population, 13,000) and Lourenço Marques (population, 47,500) are of outstanding importance. Beira's geographical situation gives it an enormous hinterland. Its railway to Nyasaland, now carried across the Zambezi, has led to the capture of much of the trade of Chinde on the delta. A railway link to Tété from the Zambezi bridge is under construction. Beira is the natural outlet of the Zambezi valley, of the rich Manica Highlands, and of the Tété coalfield, and its railway to Rhodesia gives it an enormous transit trade. Rhodesia is greatly concerned in the development of this port, where modern shipping facilities are installed. The seat of administration is Lourenço Marques, on Delagoa Bay, which does a large transit trade for the Transvaal. A line projected through Swaziland should increase its importance. It has a finer natural harbour than Beira, and

SOUTH AFRICA

in particular receives a good deal of coal from the Transvaal mines, which is sent chiefly to India. The railways, including projected lines, should be carefully studied from the map. These ports have an importance for British South Africa. Should the Sinoia-Kafue 'cut-off' be completed there will be an interesting rivalry between Lobito Bay and Beira for the Upper Congo traffic. The decayed port of Sofala is interesting in that it appears to have been the port for the old Rhodesian gold-workings; a line of forts has been traced between this place and Zimbabwe. Mozambique and Quelimane are ports for rich agricultural areas; the latter has a short railway running inland, while the former has a railway which already covers half the distance to Lake Nyasa and will be completed to it.

Trade. Ignoring the large transit trade, imports in 1938 were valued at £4,100,000 and exports at £1,800,000. The leading import was cotton goods, while railway material and machinery were also big items; others were motor-cars, oil, and sacks. The leading export was sugar; ground-nuts, copra, maize, and sisal were also large items. Bananas and cotton were of less value. The Government territory does most of the trade; the company's territory's chief exports are sugar, maize, sisal, and cotton.

Beira is a very important *entrepôt*, and deals with more than 4 million tons of shipping annually. The value of its local trade in 1938 was barely £1,100,000, while that of its transit traffic was £14,800,000. Of 1,300,000 tons of goods handled, nearly 1 million tons were to or from the Rhodesias, the Belgian Congo, and Nyasaland; copper and chrome-ore, zinc, asbestos, maize, and tobacco from these areas are exported, and oils, timber, machinery, and construction materials are imported for them. The port normally handles a quantity of goods only exceeded in this economic region by Durban and Cape Town.

Lourenço Marques in the same year had a transit trade valued at £10,400,000, mainly traffic up to the Transvaal. The local trade totalled barely £2½ million. Delagoa Bay is guaranteed 50 to 55 per cent. of the Rand traffic by treaty in return for facilities for recruiting labour for the Rand

AFRICA

mines. The port dealt with over 6 million tons of shipping during the year.

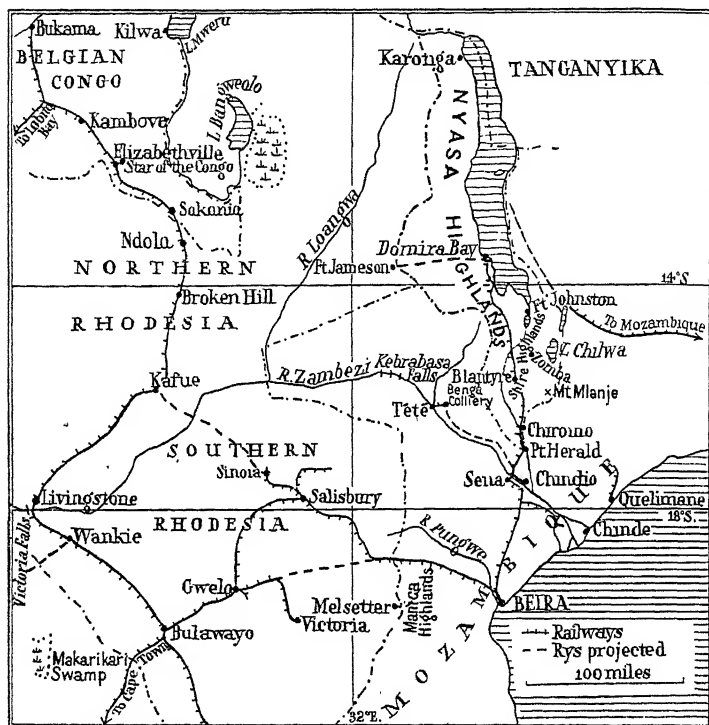


FIG. 96. THE RAILWAY NODALITY OF BEIRA

The old ferry at Chindio has been replaced by the longest railway-bridge in the world at Sena, giving Northern Rhodesia access to the sea. The Sinoia-Kafue 'cut-off' has become an urgent question in Rhodesia. The map explains the large transit trade of Beira, grown from £8,600,000 in 1931 to nearly £15 million in 1938.

· NYASALAND

This protectorate, adjoining Lake Nyasa, covers 38,000 square miles (excluding 10,500 square miles of water), with a population of some 1,700,000 (1850 are whites and 1750 Indians). It lies mainly west and south of Lake Nyasa, and

SOUTH AFRICA

consists of three divisions, the Rift Valley occupied by Lake Nyasa and the Shiré river, the bordering highlands to the west, and the Shiré Highlands and Mlanje Mountains to the south-east. The lake-level varies considerably. It has been known to decline 6 feet in the dry season. The Shiré is of little value for navigation. Its exit from the lake is silted up, and rapids obstruct its middle course. However, Port Herald, in the lower reaches, can be reached from the Zambezi in the wet season. Lake Chilwa (or Shirwa), to the east, is shallow and brackish.

Climate. Tropical temperatures are modified by altitude over the greater part of the region, and white settlement is said to be possible on all the highlands, including the Shiré Highlands, above 2500 feet. But the complete suitability of this, as of other parts of tropical Africa, for white settlement must be regarded as somewhat doubtful. At the higher elevations the daily range of temperature is considerable, especially in winter, when night frosts are common and snow has been known even in the settled districts. The wet season is, broadly speaking, from November to March; the total rainfall is about 30" in the Shiré valley, 40" to 50" on the Shiré Highlands, over 50" on the north-west highlands, and 110" on Mt Mlanje, which reaches nearly 10,000 feet. Thunderstorms are common in the wet season, when Zomba has an average of twenty.

Productions. Livingstone first saw Lake Nyasa in 1859; missionary penetration and slave wars followed, and settlers, many from Scotland, gradually came to the highland. When the protectorate was declared in 1891 settlers had 1600 acres under cultivation; they now occupy well over half a million acres. The natives, of Bantu stock, and in some districts rapidly becoming Mohammedanized, generally prefer the lower elevations; the native problem is not acute as it is in Kenya, and native cultivation for export is increasing. Their wasteful methods of forest-clearance in the past have, as in other parts of tropical Africa, reduced this type of vegetation to a small area, and much of the cover is now of the bush type. The principal timber is the Mlanje cypress, a variety found elsewhere in Africa only in the

AFRICA

Melsetter district of Southern Rhodesia; it provides a durable timber resistant to the white ant, and is being conserved. Eucalyptus-trees have been widely planted in recent years. There is evidence of great variety of mineral wealth in the old and faulted rocks of the highlands, but not generally in useful quantities; deposits of bauxite in the Mlanje district could be worked if they were reasonably accessible.

The natives cultivate primarily for their own needs; their crops include cassava, millet, rice, Kafir corn, sweet potatoes, beans, maize, and ground-nuts. Nevertheless, to-day their production of both tobacco and cotton is far greater than that from white plantations, though the quality is not so good. It is noteworthy that many of them find employment in Southern Rhodesia and other parts of South Africa. The history of the white plantations—which need machinery and scientific farming owing to labour conditions—is instructive in showing the widespread experiments in the selection of suitable crops, and the dependence on an outlet if a region of this character is to be developed. Tobacco—as in the rest of South Africa, almost entirely pipe tobacco—covers the largest acreage, and in many recent years has been the leading export. Cotton once headed the list of export values; upland varieties are cultivated, and the native cultivation, encouraged by Government distribution of seed, has expanded. The production of tea, grown on the south-east slopes of the Mlanje Mountains, is now well established, and the Cholo district, south of Blantyre, has also developed this crop, which has grown to become the most valuable export. Coffee was once so successful that it was adopted for the country's armorial bearings, but now it is of small importance. Sisal cultivation is not yet well established, and maize is another crop that has received attention.

Chillies, strophanthus, and beeswax are among minor products. The number of stock is limited, owing to the presence of the tsetse fly; the cattle are chiefly owned by natives. Encouragement is now being given to the native production of ghee.

SOUTH AFRICA

Towns. The principal settlements are at Blantyre (628 whites in the district), dating from 1876, and Zomba (260 whites in the district), the administrative centre, both in the Shiré Highlands and each the centre of considerable plantation development. The Shiré Highlands railway is Nyasaland's chief link with the outside world; it dates from 1908, and immediately stimulated development. Blantyre at 3500 feet was formerly the terminus; the Zambezi bridge, completed in 1935, now obviates the break-of-bulk on the line to Beira, and the railway continues northward nearly to Domira Bay on Lake Nyasa.¹ These developments have greatly improved the economic outlook of the colony. Another possible improvement is the continuation of the railway from Mozambique to the lake, upon which a number of small steamers ply.

Trade. Exports in 1891 were valued at £7000, consisting mainly of ivory and coffee. In 1938 imports reached £833,000 and exports £975,000. The former largely consisted of cotton goods, iron and steel, and metal manufactures and petrol. The United Kingdom sends a variety of manufactured goods, including a share of the cottons, and takes almost all the exports. These consisted in 1938 chiefly of tea (£450,000), tobacco (£400,000), cotton (£100,000), and very small values of sisal and coffee. Both tea and cotton showed increased quantities.

THE RHODESIAS

The Zambezi separates Northern from Southern Rhodesia, and is more than a political divide. Northern Rhodesia covers twice the area of Southern Rhodesia, is nearer the equator, has a heavier rainfall, has many fewer white settlers, and seems distinctly less favourable for Europeans. Until 1923 each was administered by the British South Africa Chartered Company, but then Southern Rhodesia became a self-governing colony, and a year later the Crown relieved the company of the administration of Northern Rhodesia.

¹ A progressive rise in the lake level from 1915 onward drowned the Domira Bay area, and the railway reaches the lake some miles to the south (Chipoka). Recently a decline in the lake level appears to have set in.

AFRICA

Southern Rhodesia stretches across the Limpopo-Zambezi divide and Northern Rhodesia across the Zambezi-Congo divide, but, broadly speaking, they together constitute a large area of plateau seldom below 3000 feet and nowhere reaching 6000 feet. Southern Rhodesia has big farming and mining activities, but although there has been a remarkable development of Northern Rhodesia's mineral wealth, it is at present doubtful how far white settlement is possible for agricultural activities.

The ancient crystalline foundation of Africa covers the greater part of the area and occupies the higher ground; it consists mainly of granite and gneiss, and on the surface is lateritized into a red ferruginous clay. Younger sedimentary rocks occur by the Zambezi and in Barotseland, and in Southern Rhodesia contain large areas of coal-bearing formations. The rainfall, which comes in summer, is greatest in the east and north, and declines toward the west and south-west, so that Barotseland and a belt in the south-west of Southern Rhodesia have a rainfall which in places falls below 15". The rainy season tends to be longer toward the Congo. In the middle of the wet season the rainfall is usually of a heavy convectional type. The total rainfall is subject to wide fluctuations, and this, among other things, has greatly handicapped cotton-growing in Southern Rhodesia. The maize crop is also seriously affected by these variations. Though often referred to as veld, the plateau vegetation is largely of the park-land type, with trees more numerous in the east and north, but merging into dry pasture and scrub in the more arid regions. Big game is still fairly plentiful, and a little ivory is obtained. Mining development and the modification of temperature by altitude have mainly determined the distribution of the European population.

Northern Rhodesia

This Protectorate covers 288,000 square miles, and it had in 1938 1,381,000 natives and 13,155 whites. In 1921 the whites numbered 3634. It is mainly drained to the Zambezi, by the Kafue and the Loangwa, the latter

SOUTH AFRICA

occupying a remarkable tsetse-infested trench; but in the northerly projection of the territory are found the headwaters of the Congo, with the brackish Lakes Bangweolo and Mweru, and the southern end of Lake Tanganyika,

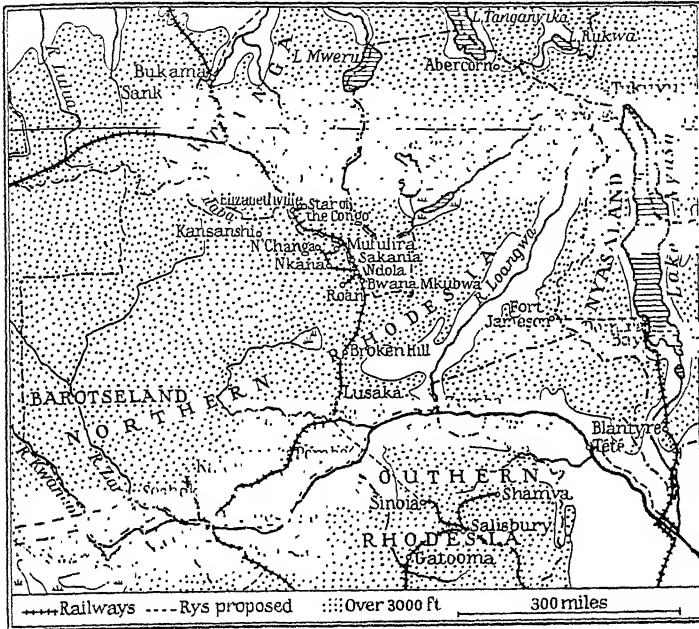


FIG. 97. NORTHERN RHODESIA

Railway development is almost entirely limited to the one trunk-line, with short branches to the neighboring districts. Note the shortening of the railway from Sinoia to Kufue, and the proposed Sinoia-Kufue cut-off. Points on the trunk line, as well as the ways, have only a mere handful of wheeled traffic. The Longwa trench, its center is by road to Bhamo.

which also has a tendency to salinity. The highest ground is along the Tanganyika-Nyasaland border. Much of the lower ground in the west of the country is troubled with 'fly,' so that comparatively few cattle are kept by the natives and labour is relatively easy to obtain. The Katanga district and Southern Rhodesia recruit labour here, as do the local mines. The farming section of the white population

AFRICA

is largely found along the railway (which keeps generally to higher country), cattle-raising and dairying being the chief interests between Kaloma and Pemba, with cultivation farther north, notably round Lusaka, where a little irrigation wheat is grown. Maize covers the largest acreage; tobacco is important, though somewhat declined recently. Cotton has not been very successful; ground-nuts and other crops are of minor importance. Away from the railway the chief farming centres are Fort Jameson, a tobacco centre, and Abercorn, where a beginning has been made with coffee. Cattle and maize find a market in the mining areas of the Congo border.

There has been remarkable mining development. The old mining centre of Broken Hill has yielded much lead, zinc, and vanadium; vanadium production has expanded considerably; there is a fair production of zinc, but little of lead. Careful preparatory work by the Congo border, including aerial survey, health measures, and branch railways, brought this copper area to the producing stage. The centre of the copper belt (including such mines as Roan Antelope, Mufulira, Nkana, and Bwana Mkubwa) is Ndola (1000 whites). The ore is of high grade and costs of production relatively low, and the development accounts for both the rise in the export figures and the increase in the white population. Over 200,000 tons of copper were produced in this important area in 1938, when some 3000 whites and 27,000 natives were employed in it. Prospecting continues, and other copper deposits by the Katanga border are known, as at Kansanshi. In the last few years the Nkana mine has become the world's largest producer of cobalt, the ore being found in conjunction with copper ore. There is a little gold production.

Barotseland is a native reserve; the rivers flood in summer, and in the dry season the region has a very parched, sandy aspect. Transport is difficult. The natives raise a little maize and Kafir corn in the wet season and keep a few animals.

In the dry season the surface of the plateau is dusty, and in the wet season it is sticky. Road development is pro-

SOUTH AFRICA

ceeding, the only railway (apart from branches in the copper area) is the trunk-line from Livingstone (1000 whites), the old capital, near the Victoria Falls, through Lusaka (1000 whites), the new administrative centre, and Broken Hill to Katanga. The proposed Kafue-Sinoia line would be a valuable connexion. Fife and Abercorn may possibly be connected with the Dar es Salaam line; these centres already find Lake Tanganyika a useful means of communication. Fort Jameson hopes for a line to Domira Bay on Lake Nyasa. The Zambezi has some value for communication.

Trade. The table illustrates the heavy imports during two years of preliminary development work in the copper

—	1927	1930	1931	1937	1938
Imports (£1000) .	1,957	4,863	5,141	4,004	5,114
Exports (£1000) .	729	769	990	12,021	10,130

area and the large exports with the development of the mines. The following figures are for 1938. Imports of metals, metal manufactures, machinery, and vehicles totalled £2½ million, textiles and apparel £580,000, foodstuffs £360,000, alcoholic beverages £136,000, blasting compounds and explosives £100,000. Exports included copper in all forms (£8,860,000), cobalt alloy (£475,000), vanadic oxide (£280,000), zinc (£91,000), tobacco (£73,000). The copper went chiefly to the United Kingdom and Germany. Metals represented 97 per cent. of the total value of the exports.

Southern Rhodesia

Southern Rhodesia (150,300 square miles) contains 1,152,000 natives, about 2200 Indians, and 55,500 Europeans. The chief early interest of the Europeans was in mining, but farming now employs many more people. Recent settlers have included some South African Dutch. Southern Rhodesia is to-day an important mining and farming colony, and this importance will doubtless increase as Central Africa develops and the problem of communications is solved.

AFRICA

Physical Features. The relief is simple. A belt of land over 4000 feet runs from south-west to north-east through the middle of the country, rising to over 5000 feet toward the eastern border, which itself is mountainous in character,



FIG. 98. SOUTHERN RHODESIA

The relation of the railway to the high ground is illuminating. Note the Umtali 'gateway'

Used upon a map in the "Year-book of the Colony of Southern Rhodesia"

reaching 8000 feet in the Inyanga district. This elevated belt may be termed the 'high veld.' The 'low veld,' troubled with the tsetse fly, lies by the Zambezi and Limpopo and by the tributaries which run down to each river from the high divide, the principal trench being that of the Sabi river, in the south-east. Granite and gneiss cover half the total area, and form the higher ground. Other intrusive rocks occur with them, including a remarkable dike of norite,

SOUTH AFRICA

and related intrusive material about four miles wide, stretching from north to south through the middle of the country from midway between Sinoia and Salisbury nearly to West Nicholson; at intervals it is particularly rich in chrome ore and asbestos. These rocks are mostly decomposed into a clay or loamy soil on the surface, and differential erosion has led to the development of isolated hills, known as kopjes. Older sedimentary rocks appear in the extreme south-east, but a great belt in the north-west has deposits of Secondary age, including coal-bearing formations by the Zambezi, and there is a large Tertiary sandy area on the Bechuanaland border north of latitude 20" S. and stretching east of the Gwai river. The derived soils on the plateau include 'black vlei soil,' or 'black plateau soil,' which conserves water better than most of the others.

Climate and Vegetation. The table given below indicates generally the temperature conditions of white settlement, though the figures ignore both daily and annual range. The chief settlement is above 4000 feet.

ALTITUDE (FEET)	PERCENTAGE OF TOTAL AREA	MEAN ANNUAL TEMPERATURE (° F.)
3000-4000	38·4	65 to 72
4000-5000	22·7	63 to 68
Above 5000	1·9	60 to 65

The rainfall by the Limpopo is below 15"; otherwise it broadly increases eastward from an average of 20" in the west to over 40" on the eastern highlands. Very scanty rain marks the dry season, from April to September; the second half of the wet season, from January to March, brings the greatest precipitation. Though variable from year to year, the annual rainfall is on the whole steadier than in many other parts of South Africa. Salisbury, at 4850 feet, ranges in temperature from 56° F. to 70·5° F., and averages 32" of rain, 1" being the total for May to September inclusive. It is obvious that agriculture must be chiefly concerned with summer crops, unless irrigation be possible; fortu-

AFRICA

nately the granite, especially in the east, retains much moisture, and perennial streams are common.

The prevailing vegetation is of the park-land type, tending to a dry character in the west and south-west. Much of it in the east is classed as savanna forest, and there is even a little evergreen forest on the eastern borders in the gullies and trenches of the Melssetter and Inyanga districts. Attention is being given to conservation, as timber provides shelter for stock, limits erosion, and supplies fuel. Mining and railway development are stimulating a timber industry; settlers commonly plant gums and other trees round their farms.

Productions and Settlement. When Lobengula, the former Matabele king, was defeated in 1893 the highland carried a large number of cattle. The native cattle are small and hardy, but poor for both milk and beef. In 1896 rinderpest, which scourged the whole of South Africa, swept away 95 per cent. of the stock, and later lung-sickness and east-coast fever destroyed many of the regenerated herds. The Government therefore actively encourages inoculation and dipping. Two-thirds of the cattle, totalling well over 2,200,000, are in native hands; the remainder represent various grades of improvement, owing to the introduction of other stock.

Nearly three-quarters of the natives live in reserves scattered over the country, and many others on unalienated Government land. The native has not generally taken kindly to working for the settler, and the existing reserves may well prove inadequate. About one-third of the total area is allocated as native reserves, carrying nearly two-thirds of the native population; provision has been made for natives to buy further land. For employment in mines and on farms many 'boys' have been recruited from Northern Rhodesia, and strict regulations have been enforced for contract labour on the farms. The natives keep cattle, and grow millet and maize by primitive methods as their chief crops, but Government agricultural officials carry on valuable demonstration work tending to the improvement of native farming, while several small irrigation schemes, notably in semi-arid native reserves in the Sabi valley, have been carried out.

SOUTH AFRICA

The white settlers are chiefly found on the belt of highland, which the railway largely follows. Away from the railway ox transport is still very important; it is supplemented by donkeys and mules, though a fair network of motor-roads now exists. Cattle-raising predominates in the drier south-west, and in the neighbourhood of the towns a dairying industry is being built up. Many beasts are sold for the Katanga and Johannesburg markets, and cold storage facilities are developing; small exports of beef are made, and West Nicholson has a meat-extract works. Pig-breeding, assisted by local supplies of maize and a few bacon factories, may have a promising future if markets can be developed. Sheep are not yet very common, but it is believed that breeds for both mutton and wool should do well. A little horse-breeding is carried on.

Maize is the chief crop; the commercial cultivation is chiefly in the wetter east, and the quality is usually very high. The principal producing districts are in the regions marked by Salisbury, Sinoia, and Shamva, an area of relatively dense white settlement. The same areas produce the greater part of the tobacco crop, which is now well established; both Virginian and Turkish varieties are grown—mainly the former—and a considerable proportion is suitable for cigarette-manufacture. Cotton cultivation is not well established yet, owing to labour and other difficulties, but large areas are suitable for the crop, for which Gatooma is a centre. Winter wheat, ground-nuts, haricot and velvet beans, sunflowers, and sugar are other crops. Irrigation is at present limited; there are many small local schemes, and the Mazoe reservoir about 30 miles north of Salisbury is a considerable undertaking. A larger reservoir 17 miles south-west of Victoria has recently been completed. Citrus fruits and wheat are grown with irrigation, and a small but steady export of oranges has been established. Deciduous fruits can be grown in most parts of the colony.

Mining. Mining brought the railway to the country. It employs to-day some 90,000 persons, including over 3000 Europeans. The colony is scattered with the remains of an ancient and mysterious gold-working and agricultural

AFRICA

civilization, remains of which are seen in the famous ruins at Zimbabwe, just south of Victoria. Much gold gained in modern times has come from the old workings. Gold is worked at many places along the railway from Bulawayo to Umtali, Gatooma being an important centre. Although most alluvials have been worked out, it is noteworthy that small workers as opposed to large companies contribute a



FIG. 99. INTERIOR OF ELLIPTICAL TEMPLE, ZIMBABWE
High Commissioner for Southern Rhodesia

considerable share of the output by working small reefs that would be uneconomic for large-scale methods. Chrome ore comes chiefly from a hill composed almost entirely of the mineral at Selukwe. Asbestos is worked in a belt from Bulawayo to Victoria, notably in the Shabani district; the quality is high, and the production has greatly expanded. Southern Rhodesia is among the world's chief suppliers of chrome iron ore and asbestos. There is some production of tungsten, tin, and silver, while copper, arsenic, platinum, wolfram, mica, iron, and lead also occur. Coal is worked at Wankie, favourably situated on the railway to supply coal and coke to the copper belt of Northern Rhodesia. There

SOUTH AFRICA

are enormous reserves of good steam and coking coal in thick seams, and the recent annual production has exceeded a million tons.

Towns and Railways. Strung along the railways, which total 2700 miles, are the towns; they are laid out on modern lines, and the larger ones have modern amenities. Salisbury, the administrative centre, with 11,400 whites, and Bulawayo, with 12,200, are the most important. They are the principal market-centres, and have small industries of milling, cotton-ginning, and tobacco-manufacture. Bulawayo is the principal railway-junction, but should the Sinoia-Kafue line be constructed Salisbury would become much more important, as being on the direct route from Beira to Katanga. This line should also open up a region beyond Sinoia known to contain a good deal of gold, copper, lead, and zinc. The 'gateway' for Beira is Umtali, commanding a gap in the bordering eastern highlands. White settlement on these highlands is proceeding, another centre being Melsetter. Gwelo, a centre for mining and maize-growing, is a junction for two branch lines to Selukwe and Victoria respectively, while from near Bulawayo a branch goes to West Nicholson, from which a road runs to Beitbridge, on the Limpopo, reached by a railway *via* Messina in the Transvaal. A through line, which should become important, is planned. An interesting recent development in communication is the replacement of drifts by low-level concrete bridges, which are out of use only for a short flood period, while there has been a substantial development of roads incorporating two concrete strips for wheeled traffic.

Rhodesia occupies an advantageous position in South Africa in regard to neighbouring markets for agricultural products, and as railway projects materialize overseas markets should expand. Her particular interest at present is in the port of Beira. The Victoria Falls and the Zimbabwe ruins attract many tourists, as does the grave of Cecil Rhodes in the Matopo Hills.

Trade. In addition to the trade whose figures are shown in the table on the next page, there was a re-export trade averaging well over £1 million per annum, illustrating the importance of Southern Rhodesia's position in relation to

AFRICA

—	1936	1937	1938
Imports (£1000) .	7,000	8,570	9,760
Exports (£1000) .	10,150	11,980	11,880

adjacent countries. They exclude, however, the large transit trade between Beira and Northern Rhodesia.

The biggest imports are in the class of metals, machinery, and vehicles (£4½ million in 1938 and including 2300 motor vehicles), followed by textiles and apparel (£1,620,000). Large quantities of foodstuffs and drink were imported; other considerable items were timber, blasting compounds, motor spirit, and various manufactured goods. Of the exports gold led at £5,700,000, followed in order by asbestos (£1,274,000), tobacco (£1,260,000), chrome ore (£520,000), coal, maize, meat, hides, and cigarettes (£73,000). Other export items included live cattle, sugar, butter, and eggs, showing very varied economic activity.

THE BECHUANALAND PROTECTORATE

This large area of about 275,000 square miles has approximately only 266,000 people (1900 Europeans). This figure demonstrates the generally arid character of the territory, but some observers believe that it could support many more people. It stretches between the Chobe Swamp in the north and the Molopo 'river' in the south. In the north central region is the series of depressions represented by the Cubango (Okavango) marshes, Lake Ngami, and the Makarikari Salt-pans. The Cubango (Okavango) brings a fair amount of water from Angola, but papyrus and reedy growths choke the river. The Botletle river carries most of the water to the Makarikari Salt-pans, and but little now escapes to Lake Ngami, which is normally a marsh, though in a year of heavy rains it may become a shallow lake. There is evidence of progressive desiccation here, and the known conditions of the local tribes during the last century bear this out. It is possible that recent slight earth-movements have helped to cut off water from Lake Ngami.

SOUTH AFRICA

The Kalahari is a poor pasture-land for the most part, its value varying from year to year according to the rainfall. There are considerable areas of sandy soil with little or no vegetation, as well as patches of scattered stunted acacias and other trees. The baobab is occasionally met with. The natives keep considerable numbers of cattle, as well as sheep and goats, and produce small crops of maize and Kafir corn, which vary in amount with the precipitation. There are many plants storing water, including a bulbous 'water-root' that is sought by both man and wild animal. In the dry season water is obtained by boring in the riverbeds. The extreme north of the country is savanna forest, and should be capable of supporting more people. Serowe, a glorified village of 29,000 people, is the headquarters of the chief tribe, the Bamangwato. The Europeans are chiefly officials, missionaries, and traders; there are, however, some farmers and gold miners on the Tati concession, an elevated district served by the 'Cape-Cairo' railway, which traverses the eastern border.¹ This area sends small exports of stock and dairy produce to the Rand.

Professor Schwarz, after making a first-hand study of the region, was of the opinion that a dam at Ngoma would divert water from the Zambezi into the depressed area. This, he claimed, would increase the rainfall of the Kalahari and permit irrigation. The proposal has been received very critically.²

The protectorate is administered from Mafeking, but there is an Assistant-Commissioner at Francistown. Its transfer to the control of the Union of South Africa has been discussed. The total trade is valued at about £600,000 annually.

SOUTH-WEST AFRICA

This Union mandate (Class C) covers 318,000 square miles, and surrounds the small *enclave* (430 square miles in area) of Walvis Bay, actual British territory, though now under

¹ A survey has been made for a railway passing through the Protectorate. The most favoured route would leave the Cape-Cairo line near Wankie and link up with the line from Gobabis to Walvis Bay in South-West Africa.

² Report of the Kalahari Reconnaissance of 1925 (Pretoria, 1926). See also *The Desiccation of Africa*, by E. Schwarz (Johannesburg, 1918).

AFRICA

the South-West Africa administration. The white population is about 31,000, one-third Germans and the bulk of the remainder South Africans. The natives number about 258,000. English, Afrikaans, and German are all official

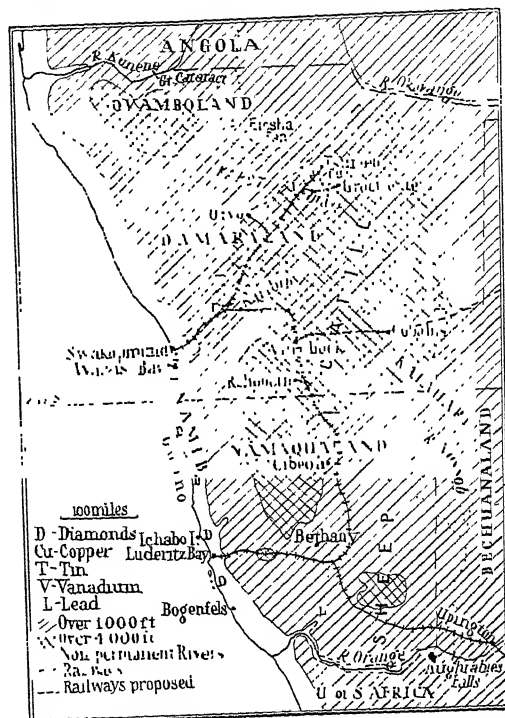


FIG. 100. SOUTH-WEST AFRICA

languages. Prior to the Great War the German administration was often in conflict with the natives, whose numbers were greatly reduced. The aboriginal Bushmen, scattered in the east and north-east, are now few in number; there are Hottentots in the south, while the remaining natives are Bantu negroes, including Hereros in the central region, and the Ovambo, the most numerous, and providing the chief labour supply, to the north of the Etosha Pan.

SOUTH AFRICA

Physical Features and Climate. The coast rises rapidly to the plateau of ancient crystalline rock, of which the great central area exceeds 4000 feet, a few small areas—one near Windhoek—reaching over 6000 feet. This plateau dips gently toward the Kalahari in the east and northward to the Etosha Pan. There are no permanent streams apart from the bordering rivers, Kunene, Okavango, and Orange, owing to the limited rainfall and relatively high temperature. The bulk of the area lies north of the Tropic of Capricorn, but the Benguella Current keeps the coast comparatively cool and bracing, and in the interior temperatures are considerably modified by elevation. Nights are nearly everywhere always cool, owing to great radiation through a usually clear and dry atmosphere. The rainfall increases eastward to the plateau, decreasing beyond into the Kalahari. It is heaviest in the north, about 20", and lessens gradually southward to about 5" in the neighbourhood of the Orange River; the least rainfall is in the Namib, where Walvis Bay averages 1". Except for the south, which gets a little winter rain, the wet season is the summer.

TOWN	HIGHEST MEAN MONTHLY TEMPERATURE	LOWEST MEAN MONTHLY TEMPERATURE	ANNUAL RAINFALL
Swakopmund . . .	63·5° F.	55° F.	0·7"
Windhoek (5460 feet)	74·5° F.	55·5° F.	14·8"

The Namib is a desert, and Namaqualand has a very poor vegetation cover, similar to that of the Karoo. Another barren region is a karst area with underground drainage just south of the Etosha Pan. The rest of South-West Africa is pasture-land of varying quality, with a good deal of bush country; only in the north can it be described as wooded; there the better rainfall leads to a park-land type of country.

Productions. It is obviously incorrect to regard South-West Africa as a barren region; it is essentially pastoral, and before the white occupation supported large herds. The settlers are typical pastoralists, and the conditions suit cattle

AFRICA

in the central and northern districts and sheep and goats in the drier south. Pastoral farming is assisted by the sinking of numerous bore-holes, water now being obtainable in this way in most districts. There are some 900,000 cattle and 4,500,000 small stock, but it is believed that the land could support many more. The use of underground water permits of dairying being carried on; a trade in cattle and cattle products, including butter, has been built up. The outstanding feature of the sheep-rearing is the large number (over 2 million) of the Karakul breed, from which 'Astrakhan' pelts, or 'Persian' lambskins, are obtained. There is some local irrigation, which is not as yet important. Limited cultivation of maize, beans, wheat, and potatoes is chiefly carried on in the Grootfontein area.

It has been suggested that the Kunene should be dammed on the Angola border to provide water for irrigation crops in Ovamboland; an agreement has been made with Portugal to permit of this being done.

The mineral wealth is varied and widely distributed. The production of diamonds, mostly small but of very good quality, from the sands of the Southern Namib, is large. Copper, vanadium, and lead deposits are worked in the Tsumeb district, where is situated the important Otavi mine, and tin ore is produced in the neighbourhood of Karibib. Guano deposits found on Ichabo and other islands between Walvis Bay and Lüderitz Bay are worked in declining quantities. This guano is mainly derived from gannets and penguins, millions of which live on the numerous fish inhabiting the cold waters. Dried and preserved fish, chiefly crayfish, are sent to the Union and elsewhere.

Towns. The administrative centre is Windhoek, with 4800 whites, situated in the heart of a great elevated ranching district. A railway into the country from Walvis Bay serves both the cattle area and the more important metal districts. Walvis Bay possesses the only good harbour, has displaced the old German port of Swakopmund, and does most of the trade. It possesses cold-storage facilities for the beef trade and has an interest in whaling. Railways also enter the country from the Cape province across the Orange River

SOUTH AFRICA

and from Lüderitz Bay, where Diaz landed in 1486 on his way to discover the Cape route to India, and now the chief centre of the diamond-fields and of the fisheries.

Trade. Imports and exports in 1938 totalled £2,430,000 and £3,540,000 respectively. Imports (half from the Union, but much of the remainder coming overland *via* the Union) consist mainly of varied manufactured goods, machinery, and foodstuffs. Karakul skins led the export list at £1 million, followed in order by diamonds (£826,000), butter (£423,000), live animals, copper ore, vanadium, fish, tin, and lead (£44,000). A quarter of the exports went to the Union—largely slaughter cattle and butter.

THE UNION OF SOUTH AFRICA

The total estimated population in 1939 was 10,160,000 (6,928,000 in 1921).

—	CAPE PROVINCE	NATAL	TRANSVAAL	ORANGE FREE STATE	TOTAL
Area (square miles)	276,739	35,284	110,450	49,647	472,120
Europeans . . .	818,700	199,200	897,600	201,000	2,116,500
Natives . . .	2,130,400	1,640,800	2,645,400	580,900	6,997,500
Asiatics . . .	11,300	192,400	27,500	—	231,200
Coloured . . .	723,600	19,800	53,700	17,700	814,800

These figures illustrate some of the urgent problems of the Union. South Africa is a region where the European has disturbed and yet depends upon a large indigenous population, which is increasing. The relations of white and black vary somewhat. In the Cape Province natives were formerly permitted under very restricted conditions to vote, though in practice there were few such voters; under the Representation of Natives Act of 1936 such voters are given three representatives in the House of Assembly, who must, however, be Europeans. A 'colour bar,' reserving skilled labour to the whites, is now legal in the Union, though mainly operative north of the Vaal. A Native Representation Council and a Native Trust to control and

AFRICA

develop native reserves are other aspects of a policy designed to keep the white and black communities separate and to safeguard the position of the Europeans.

The native Bantu people are the chief source of labour everywhere, but in Natal Indians, introduced for plantation work, are as numerous as the European population. The presence of many Indians led to an agreement with the Indian Government giving a definite status to those Indians who "conform to a Western standard of living." The majority are held to fall below this standard, and despite some repatriation their numbers are increasing.

The large coloured element of mixed white and black blood is another and considerable source of labour-supply, but, like native labour, is commonly regarded as inefficient. These form in effect a depressed class, nearly 90 per cent. of whom are in the Cape Province. A serious problem of a different character is presented by the "poor whites," who are 'degenerate' Europeans adopting more or less the native standard of life. For various reasons—largely failure in farming in the Cape and loss of old occupations, such as hunting and ox-wagon transport, in the Transvaal—there are many unskilled whites who from the point of view of employment may be regarded as ranking with the natives, a situation which they resent. Training and work colonies for these have been partially successful; recently many have been employed in the alluvial diamond-diggings.

Taking a long view, the most serious problem concerns the future relations of the white and black races. In many districts there is a migration of 'backvelders' to the towns which also receive a steady inflow of natives from the reserves, where a food-supply inadequate for the population is produced. The undermining of the tribal basis of Bantu life and the dependence upon native labour are resulting in the development of native political and economic aspirations. A policy of segregation, leading to separate self-supporting white and black communities, has been suggested, but this is now regarded as impracticable. Restrictions upon the natives, particularly upon 'squatters,' have recently increased; over a great part of the Union labour on farms

SOUTH AFRICA

has largely been supplied by 'squatters,' who in effect pay rent in the form of labour. The future of the Union is bound up with the solution of the difficulties created by the circumstances outlined above, but though statesmen realize the problems, they are still far from reaching a satisfactory settlement.

With regard to the relative numbers of Dutch and British stock, the last census analysis (in 1936) showed that 56 per cent. of the Europeans used Afrikaans as their home language and 39 per cent. used English; a further $2\frac{1}{2}$ per cent. used both. The Afrikaans element is least in evidence in the eastern districts of the Union and in the mining districts. Both English and Afrikaans (a modification of Dutch) are official languages.

The four constituent self-governing colonies retain only a small measure of autonomy since they became united under the name of the Union of South Africa in 1910, with a Governor-General representing the Imperial power. It is typical of the existence of the two European elements that the seat of government is Pretoria, in what was the larger of the two Boer republics, while the Union Parliament meets in Cape Town, where British penetration brought about the Great Trek which led to their establishment.

British emigration to South Africa is normally not large, and has averaged only a few thousand annually in recent years. It is not in normal times more than the number that goes annually to New Zealand, and only about one-seventh of that going to Canada.

Physical Conditions. There is a limited amount of coastal lowland. 40 per cent. of the area is high plateau above 4000 feet. About 150 miles inland runs the belt of generally highest land from the Nieuwveld Range to the Drakensbergen, but in the south the high ridges bordering the 'steps' down to the coast are an important feature. Many different names are applied to the more outstanding features of the relief. The highest and most rugged country occurs in Basutoland and on the Natal border, where erosion is particularly active in the Quathlamba Mountains, but these mountains, which are a magnificent rampart from the Natal side, appear to be little more than a row of hills when seen in the distance from the west. The plateau inside the rim tilts gently west-

AFRICA

ward, except where, in the Transvaal, the Witwatersrand forms the divide with the Limpopo.

Detailed knowledge of the geological structure is still incomplete. No fossils older than Devonian are found, so that the precise age and extent of the Primary rocks can only be estimated. The nomenclature applied to the strata in South Africa is therefore a local one. It may roughly be

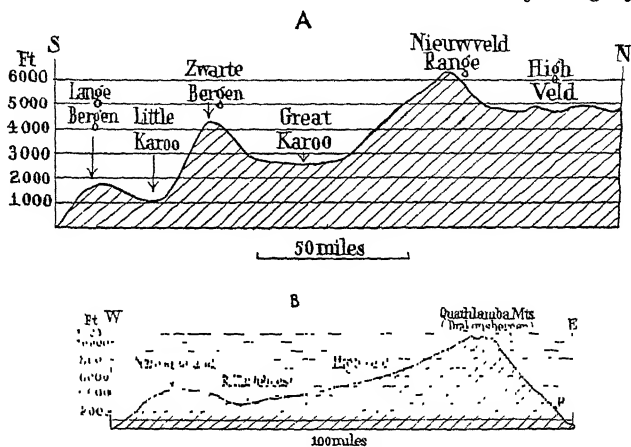


FIG. 101. A. GENERALIZED SECTION NORTH FROM MOSSEL BAY
B. GENERALIZED SECTION IN THE LATITUDE OF PIETERMARITZBURG

These sections are drawn on different scales, both horizontal and vertical. A illustrates the rimmed steps from the high veld down to the sea; B shows the South African plateau and the Drakensbergen barrier.

said that the greater part of the area is covered with the beds of the Karoo system, of late Secondary age, composed mostly of relatively soft clays, shales, sandstones, and limestones, laid down under fresh-water or continental conditions. It is interesting to note that some of the beds are of glacial origin, while others in the Stormberg series include the chief coal-bearing formations. There are many flat-topped kopjes caused by erosion in the generally horizontal formations, while numerous dolerite intrusions lead to other prominent surface features. An enormous area of volcanic rocks occurs in the Quathlamba Mountains.

SOUTH AFRICA

This great area of the Karoo system is bordered in the east and south by older rocks, except where it reaches the coast in the neighbourhood of East London. In the south a great area from the Olifants Mountains, curving round parallel with the coast as far as the neighbourhood of Port Elizabeth, is known as the folded Cape system, and consists of older Secondary rocks, largely sandstones, conglomerates, and shales, including the Table Mountain Sandstone. This belt of folded mountains is characterized by longitudinal rivers and transverse gorges. Older still are the rocks of the Witwatersrand system, found chiefly in the south of the Transvaal, and important on account of the Main Reef group of quartzitic conglomerates—the 'banket' which yields most of the gold. In the north and east of the Transvaal, and extending into Eastern Natal, there appears the ancient crystalline foundation of Africa, and there is another large area of this by the lower Orange, continuing northward into South-West Africa.

Sharply graded rivers, divided up into smooth reaches by rapids, are characteristic of South Africa. Reference has already been made to their summer flood *régime* and to the way in which the rivers of the east, with their much heavier supply of rain and steeper gradients, are eating into the eastern rim, in some cases having broken through and captured a good deal of the drainage of the Orange. Rivers with a good supply of water all through the year are found only among the relatively short ones of the south and south-east, from the Breede to the Tugela. Both these and the larger ones have a negligible value for navigation, and the deep trenches made by the rivers in the plateau, together with the flood character of the rivers themselves, make extensive irrigation schemes wellnigh impossible.

The Limpopo or Crocodile river, 1000 miles long, rises in the Witwatersrand, and drains the greater part of the Transvaal. Just before reaching the frontier, where the river leaves the Zoutpansberg plateau, are the Toto Azime Falls. During the dry winter season much of the bed of this river is merely a series of pools. Its chief tributary is the Olifants. Also rising in the Transvaal is the Komati, which cuts

AFRICA

across political boundaries to reach the sea at Lourenço Marques. The Orange, 1200 miles long, drains the greater part of the region inside the highland area. Like the Vaal, it is a poor river in the winter season, and below the junction of this tributary only occasionally receives water from its 'tributaries,' such as the Molopo and the Hartbeest. In its lower course it loses much water by evaporation, and below Prieska runs through a gorge, with a drop of 400 feet over the Aughrabies Falls near Upington. In the winter it can be forded near its mouth, which is closed by a sand-bar. All South African rivers are obstructed by silt, and as sheltered bays are rare, so also are good harbours. A good one, Saldanha Bay, has an arid and sandy hinterland.

Climate. From rising relief from the south toward the equator there results such a modification of temperature that there is a remarkable uniformity in the annual mean. Thus the mean annual temperatures of Mossel Bay, Graaff Reinet (2460 feet), Ookiep (3036 feet), and Pretoria (4392 feet) are respectively 63.3° F., 63.6° F., 63° F., and 63.5° F. The effect of ocean currents is illustrated by a comparison of the mean temperatures of Port Nolloth and Durban, respectively 57.5° F. and 70.5° F. To these general points must be added the increased annual range of temperature with distance from the sea and altitude, so that whereas Mossel Bay and Durban have annual ranges of only 12° F. those of Kimberley and Pretoria are 26° F. and 20° F. respectively. A further important factor is the daily range of temperature, which, while small along the coast, is considerable in the interior. The extreme shade readings in the interior are 125° F. and 6° F. Under anticyclonic conditions away from the coast night frosts in winter are commonly severe enough to freeze standing water, and a very large area of the Union is liable to these for nearly half of the year. A particular consequence is a considerable restriction of the area that can grow cotton.

The figures in the table opposite will repay study both as regards the total amount and the distribution of the rainfall. Note in particular the variations along the coast between Cape Town and Durban.

The following rainfall totals may be found useful: Port

TABLE ILLUSTRATING THE RAINFALL IN DIFFERENT REGIONS OF THE UNION

MEAN MONTHLY RAINFALL, IN INCHES															
PLACE	REGION	ALTITUDE (FEET)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cape Town	Mediterranean	40	0.66	0.60	0.85	1.86	3.68	4.35	3.58	3.34	2.26	1.62	1.05	0.80	24.65
Knysna	Warm temperate forest of middle of south coast	950	2.02	2.14	2.47	2.20	2.40	1.16	2.12	2.55	3.01	2.64	2.36	2.31	27.38
East London	Thorn veld	150	2.97	3.15	3.78	2.62	2.29	1.52	1.55	1.87	2.94	3.66	3.24	3.12	32.51
Durban	Palm belt	260	4.59	5.23	6.03	3.60	2.64	1.77	1.68	1.77	2.75	5.14	6.68	5.16	45.08
Pietermaritzburg	Thorn veld	2218	5.56	4.91	5.30	1.93	1.04	0.49	0.48	0.99	1.94	3.35	4.36	5.70	36.06
Johannesburg	Middle veld	5925	6.17	4.90	4.32	1.73	0.77	0.18	0.58	0.45	0.95	2.48	4.90	5.37	32.6
Oudtshoorn	Karoo	1014	0.50	0.69	1.18	0.94	0.94	0.71	0.56	0.76	1.02	0.80	0.78	0.64	9.52
Calvinia	Semi-desert	3500	0.37	0.42	0.80	0.97	1.12	1.06	0.91	0.87	0.61	0.50	0.38	0.22	8.23
Port Nolloth	Namaqualand	16	0.06	0.05	0.16	0.22	0.38	0.38	0.34	0.32	0.18	0.12	0.07	0.09	2.37

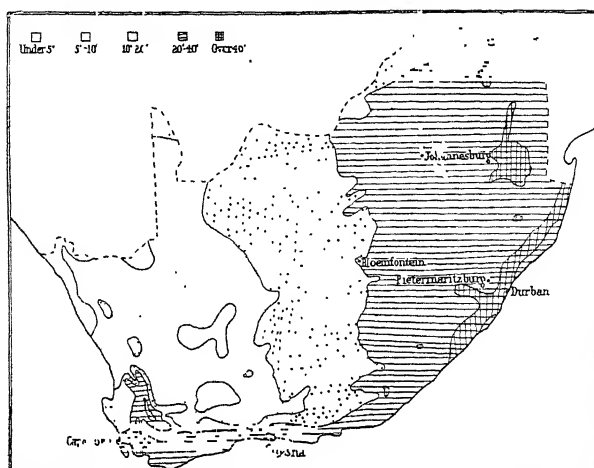


FIG. 102. UNION OF SOUTH AFRICA—MEAN ANNUAL RAINFALL
Based upon a map in the "Year-book of the Union of South Africa"

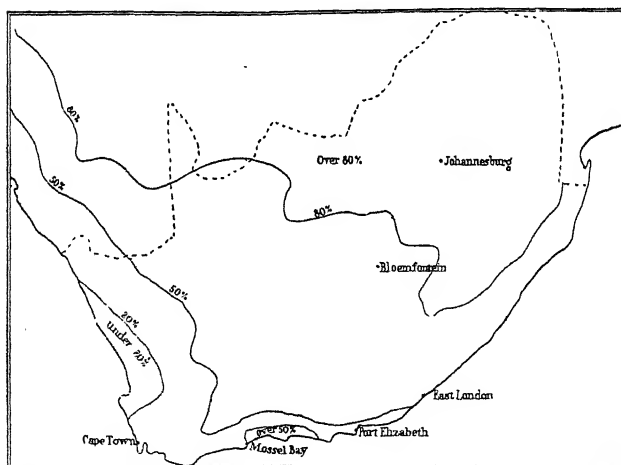


FIG. 103. UNION OF SOUTH AFRICA—PROPORTION OF RAIN
FALLING IN SUMMER

Based upon a map in the "Year-book of the Union of South Africa"

SOUTH AFRICA

St Johns, 50"; Eshowe (Zululand), 58"; M'babane (Swaziland), 54"; Mafeteng (Basutoland), 30"; Rustenburg, 25.5"; Graaff Reinet, 13.8"; Ookiep, 6.7".

The general variations in the amount and distribution of the rainfall are indicated in the table. The heaviest rainfall, exceeding 40", is found in a coastal strip in the neighbourhood of Durban and on parts of the high eastern rim of the

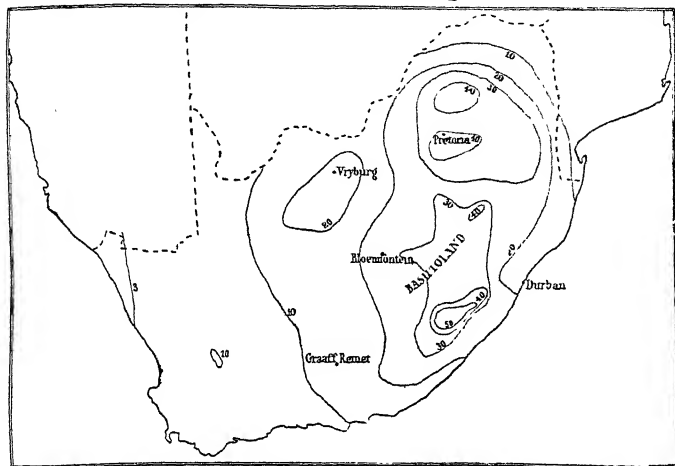


FIG. 104. UNION OF SOUTH AFRICA—MEAN ANNUAL NUMBER OF THUNDERSTORMS

The largest numbers are associated with the Drakensbergen and the high veld.

Based upon a map in the "Year-book of the Union of South Africa"

plateau. On the map of annual isohyets the 20" line is the most important, as broadly demarcating the agricultural from the mainly pastoral zone and bringing out the importance of the north-to-south ridge of the Olifants Mountains in increasing the rainfall in the Cape Town corner. The map showing the percentage of rain falling in summer is very illuminating in distinguishing the area of Mediterranean character in the south-west corner and the eastward continuation of it with a well-distributed rainfall. The prevailing summer rain is due to north-easterly and easterly winds moving in from the Indian Ocean when the pressure

AFRICA

over South Africa is relatively low. The interior precipitation is variable in amount from year to year, and is mainly through the agency of thunderstorms, often associated with hail. These are frequently preceded by unpleasant dust-storms. The Johannesburg district has an average of considerably more than forty thunderstorms per annum. Snow, on the other hand, is exceedingly rare, except on the highest elevations. A feature of the climate of the coast-lands and of the foot of the plateau is the occurrence of hot, dry Berg winds, blowing intermittently, chiefly in winter along the west and south coasts, but most commonly in spring elsewhere. They descend from the plateau, and, being warmed by compression, may temporarily raise the maximum temperature on a winter's day above corresponding summer temperatures. Like Australia, South Africa may be called a land of sunshine. The percentage of the total possible hours of sunshine at Cape Town is 66 and at Johannesburg 73; in London it is 29. Evaporation from water-surfaces is in consequence very great, being everywhere equivalent to more than 60" per annum.

From the point of view of the European, the climatic conditions over the greater part of the area permit genuine settlement without the debilitating effects that seem to occur in elevated regions in lower latitudes. The South-African-born whites are generally of good physique, and are able to carry on outdoor occupations without undue discomfort for the greater part of the year. From the farming point of view, there are two serious drawbacks to the rainfall: the first is its unreliability, which affects the quality and yield of crops and stock; the second is its torrential character, which involves the rapid run-off of the much-needed water and the rapid erosion of the surface soil, a destructive factor on many farms. Such rainfall is far less valuable to the agriculturist than are gentle, prolonged falls. Tree-planting and conservation dams are tending to limit the damage due to the nature of the rainfall.

Vegetation. As in other lands where development is proceeding apace, the natural vegetation of the lands of the Union is being masked. In some cases introduced plants

SOUTH AFRICA

have become almost a pest, as in the case of the jointed cactus.¹ Plantations of eucalyptus and acacias are masking the veld in the neighbourhood of Johannesburg, and form now a useful timber-supply for the mines. Wattle (acacia) plantations have great economic importance in Natal.

The forest element in the indigenous flora is very limited. Tall timber trees are prominent in the relatively dense

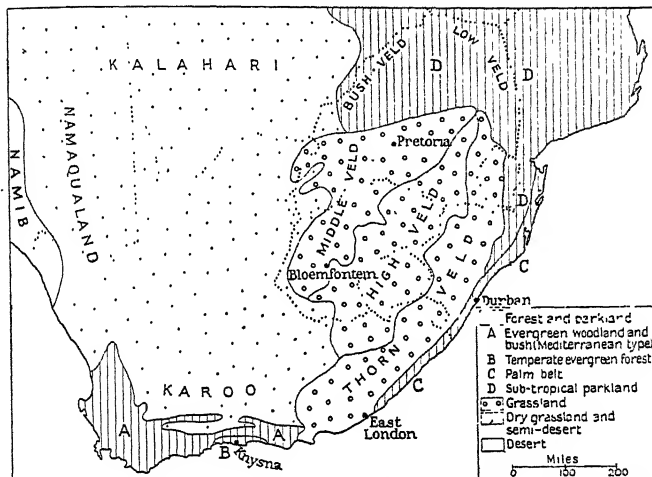


FIG. 105. UNION OF SOUTH AFRICA—VEGETATION

Simplified from maps in the "Year-book of the Union of South Africa"

vegetation of the evergreen palm belt, and considerable inroads have been made upon the hard timbers, such as stinkwood, sneezewood, and black ironwood. The only other areas of true forest are found in the Knysna area of the south coast and on the windward slopes of the Drakensbergen escarpment in the east of the Transvaal. These evergreen, broad-leaved forests are mostly confined to the slopes and gullies; they contain varieties of yellow-wood, a conifer yielding a soft but useful timber. An area towards the

¹ The indigenous prickly pear has been a worse pest; it is being controlled by liberating an insect—*Cactoblastus cactorum*—in the infested areas, a method successfully followed in Australia. It has been found that the cochineal insect keeps down the jointed cactus, introduced as an ornamental plant

AFRICA

north-east with a moderate to substantial summer rainfall is classified as "parkland"; it is savanna in character, with trees adapted to a drought season and considerable growth of bush and grass. It is characterized by the baobab or cream of tartar tree, as well as 'umbrella' acacias. Often spoken of as "bush veld," it includes the 'low veld' by the Limpopo. The Cape scrub is of the sclerophyllous type, with leathery grey-green leaves; shrubs predominate rather than trees, and numerous low, drought-resisting, but brightly flowering plants are common. An interesting feature is the evergreen temperate forest area in the Knysna district, the result of a well-distributed annual rainfall.

The term 'grass-land' is applied to the vegetation of the greater part of the Union. It covers the thorn veld, a long grass country with tall, succulent aloes and open acacia-bush adapted to a well-marked dry season; the 'high veld' or grass-land proper, where the high, rolling plains are almost devoid of tree or bush—a real temperate grass-land with short grass parched in the dry season; and the middle veld with mixed long and short grass. The Kalahari shows a transition toward the semi-desert type, the grass being of the dry and wiry kind and growing in tufts, varied with areas of thorn bush, and occasionally with some acacias, giving a park-like aspect to the vegetation. Bulbous and succulent plants appear in this region, and become more prevalent in the semi-desert areas of the Karoo, and Namaqualand, where there is only a very scanty vegetation cover.

The Union is primarily a pastoral country of varying value, adapted according to the quality of the grass-land to both cattle and small stock. As regards both stock-rearing and cultivation, nature forces the development into the eastern half and southern coast-lands, and it is not surprising that one of the chief problems regarding stock arises from the lack of natural winter feed. In connexion with this, transhumance has developed, as the highlands bordering Natal offer winter pasture when the veld is parched.

Development. In 1652 Jan van Riebeeck landed at Cape Town with a hundred followers, and white settlement and

SOUTH AFRICA

cultivation began in this corner. The vine, with European cereals and stock, was introduced early, and a further impetus was given to a settlement by the arrival, between 1688 and 1690, of a number of French Huguenots, who brought a vigorous strain into the blood of the South African Dutch. Many French names in South Africa testify to this to-day. As in North America coastal settlements here and farther east were maintained only at the price of constant struggles with the natives. With the Great Trek to what is now the Transvaal (p. 277) this struggle was intensified ; the Dutch ultimately settled on the veld, mainly as pastoral farmers, and the two Boer republics were founded. The discovery of diamonds near Kimberley in 1867 brought a rush of settlers and the railway, but a more intense immigration followed the opening of the Rand gold-mines in 1886. Improved communications wrought a revolution in the farming ; cultivation extended, and since the establishment of the Union in 1910 the Government has applied itself to the scientific organization of agriculture. This fact is probably connected with the dominance of the Dutch element in the Legislature ; the British element is largely concerned with mining and industry. Improvement of stock, control of stock diseases, research and experiment in connexion with the quality and yield of crops, the establishment of new cultivations—these are among the activities that characterize development to-day, and have followed in the wake of mineral exploitation, of developing railways, and of political settlement.

Although the value of the mineral output greatly exceeds that of agricultural products, agriculture employs even to-day far more people, and it is reasonable to suppose that the permanent prosperity of the Union is bound up with occupations on the land.

Water-supply and Irrigation. Many areas whose average annual rainfall appears sufficient for the commoner farm crops are found in practice to be semi-arid except in favourable years. Spring and autumn are critical seasons, especially the former, when rivers are commonly lowest in September and dry; parching winds are the rule. Owing to the character

AFRICA

of the rainfall and river-system, water-conservation has always been important. It is estimated that only 6 per cent. of the rainfall of the Union is taken by the rivers to the sea, and, while an enormous amount is lost by evaporation, there remain large quantities of underground water. Tapping this water are some 60,000 bores. Wells and bore-holes with wind-pumps are common, but storage in the river-valleys is limited by the nature of the river-beds, which are deeply cut in the plateau. Small dams are useful for the stock-breeder, but of limited value for the agriculturist. There are no snow-capped mountains to conserve a natural supply of water, and the coastal character of most of the rainfall renders it useless for irrigating the plateau. Irrigation schemes are too expensive in South Africa to be applied to any but the best soils, and large areas of alluvial soils hardly exist. The prolonged denudation of Africa has, in fact, resulted in a general barrenness of soil, and it has been estimated that only 2 per cent. of the gross area of the Union can be classed as good cultivable land. Irrigation is therefore confined to limited areas in river-valleys and of some 3 million acres (estimated) of irrigable land in the Union most would be far too costly to irrigate. The total area of irrigated land in 1938 was estimated at 350,000 acres, including 80,000 acres fallow.

The Irrigation Department of the Union Government has supervised schemes of the perennial type, as they need careful and scientific planning. Some are diversion schemes for normal farming operations; others are conservation works. Several are large, and the Vaalbank storage, commanding, with the aid of a diversion weir near Fourteen Streams, 100,000 acres of irrigable land north of that place, is stated to be the largest in the Southern Hemisphere. Of those listed in Fig. 106 the Kalkfontein scheme is under construction; of the remainder the Brandvlei storage irrigates the smallest area—19,000 acres. A disturbing feature connected with these enterprises is the accumulation of silt behind the dams—very serious by reason of the reduction in the volume of the stored water in the cases of the Tarka, Lake Mentz, Grass Ridge, and Van Rhyneveld's Pass storages.

SOUTH AFRICA

Such costly undertakings represent a large and unremunerative expenditure. The land is devoted largely to cereals and fodder crops; lucerne and root crops are grown for cattle and dairying purposes; and there is a good deal of truck-farming, vegetables such as tomatoes finding a

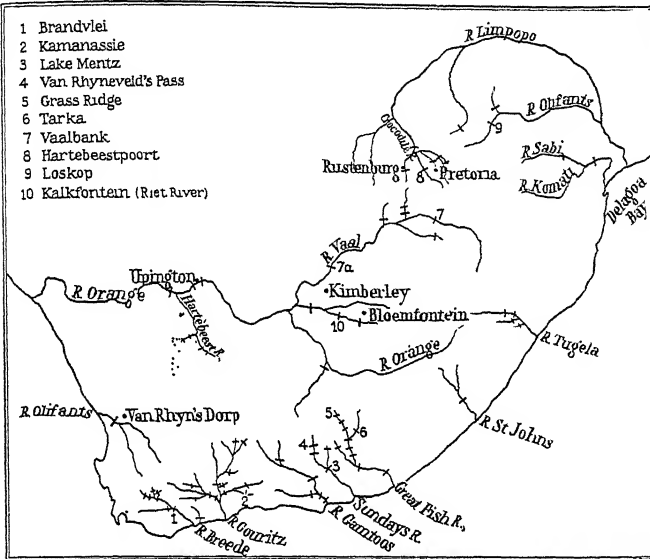


FIG. 106. UNION OF SOUTH AFRICA—LOCATION OF IRRIGATION SCHEMES

Not all of those marked are storage dams: some are diversion weirs, thus 7a, is the diversion weir for the water stored behind the Vaalbank dam (see text). The largest storage dams are named.

ready market. Tobacco is another interest. Citrous fruits find a local and export market, as do table grapes and wine from the vineyards of the south-west. High-priced irrigated land must be intensively farmed.

Cultivation. Farming by Europeans depends on the labour of native 'boys' and the use of the ox as a draught animal, although the donkey and mule or the tractor are tending to displace the ox. The locust is a periodical plague, and has been known to sweep southward as far as Table Bay itself.

AFRICA

The standard method of dealing with the pest is to spread bait of maize bran or meal poisoned with an arsenic compound for the insect when in the 'hopper' stage, and the Government spends large sums on this work.

The outstanding crop is maize, the production of which has vastly increased since the beginning of the century. It depends upon summer rain, and its value as a staple crop is seriously affected by the irregular and unreliable rainfall in

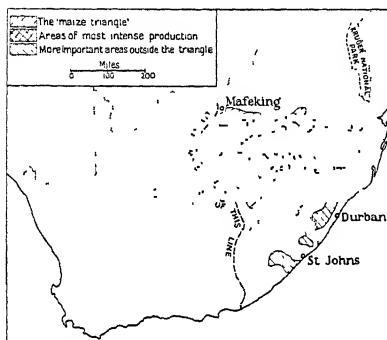


FIG. 107. UNION OF SOUTH
AFRICA—MAIZE AREAS

many districts. Although some is grown on most farms of the Union, as a commercial crop it chiefly comes from the 'maize triangle' in the Transvaal and Orange Free State between Mafeking, Middelburg, and Bloemfontein, this high-veld area producing two-thirds of the total crop. The production is specially heavy in a belt between Springs and Ermelo. The mid-

land area of Natal and the eastern part of the Cape Province are also important regions, while nearly one-fifth of the total is grown by native tribes in the Transkei, Zululand, and Swaziland. The average yield is low, and is highest in Natal; nevertheless, there is normally a large export, and the dry atmospheric conditions favour a high-quality grain. Maize (mealies) is the staple native food in the Union, and is an important element in the diet of Europeans. An increasing amount is being fed to stock as cattle-rearing develops. It would seem that the yield of maize, as of other crops, could be greatly increased by better cultivation and by the general use of manures, especially phosphates, for the soils of South Africa are mostly very deficient in mineral content.

Winter crops of wheat, oats, barley, and rye are important. Wheat is by far the largest crop of the four, and is grown for

SOUTH AFRICA

the grain, but a large proportion of the oats, barley, and rye provides green-feed for stock. Some three-quarters of the area under these crops is in the Cape Province—mainly in the 'Mediterranean' corner; elsewhere they are found in that province and in the Orange Free State, toward the Drakensbergen. The yield is low, largely owing to soil deficiency; some is grown under irrigation. The production has increased, and imports are now restricted to small quantities of high-grade wheat.

Many varieties of millets are grown, the term 'Kafir corn' being strictly applicable to the indigenous sorghum. Millets are, of course, resistant to drought, and Kafir corn is still a staple of the native farming, providing food and fermented drink. Europeans grow only a small acreage of millets, but the cultivation of certain varieties for fodder in areas too dry for maize appears to be increasing.

Potatoes are a widespread crop, as are beans (dried beans find a good market in the Rand mines), while there has been some development of ground-nuts in the Waterberg district of the Transvaal. The foliage of certain beans, including soya, and of ground-nuts is often used as fodder.

Both Virginian and Turkish types of tobacco are grown, mainly the former; it is largely pipe tobacco. The Brits and Rustenburg areas of the Transvaal, parts of Natal and the Karoo, and the south-west corner of the Cape Province are among the principal producing areas, the last growing nearly all the Turkish type on the winter rainfall. In many districts tobacco is an irrigation crop.

Sugar has long been an important crop in the coastal districts of Natal and in Zululand north of Port Shepstone. These are the only parts of the Union climatically suitable

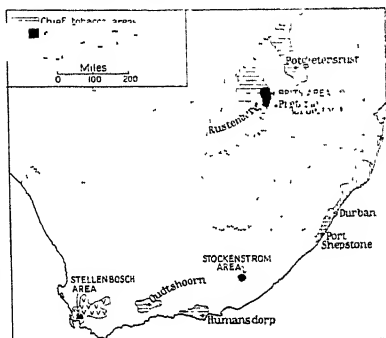


FIG. 108. UNION OF SOUTH AFRICA—
TOBACCO, VINES, AND SUGAR

AFRICA

for this crop, and the Zululand districts are not as yet fully developed. Indian labour developed the industry, though it now employs many natives, and there is now a certain export. A coastal railway serves this sugar area. There

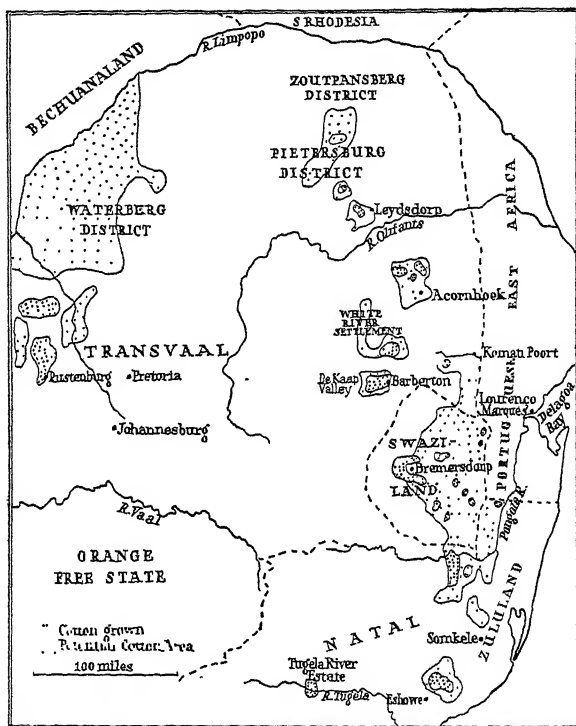


FIG. 109. UNION OF SOUTH AFRICA—COTTON AREAS

The production is small. Cotton avoids the high veld.

Based upon a map of the Empire Cotton Growing Corporation

is a declining production of tea in this region; only some two thousand acres are under this crop, situated about 1000 feet up in the neighbourhood of Stanger. Restrictions on Indian labour are leading tea-planters to favour sugar instead. Coffee is also grown in this part of Natal; disease has, however, seriously hindered its development.

SOUTH AFRICA

A good deal of attention has been given to cotton-growing, but the establishment of this industry still presents difficulties. It is more or less established in the Rustenburg, Barberton, Zoutpansberg, Waterberg, and Middelburg districts of the Transvaal, in certain districts in Natal, and in the Transkei, but the crop has not yet attained real importance. An improved strain is being cultivated, but weather conditions and the bollworm make this crop rather speculative.

A very large increase in citrus fruit cultivation—particularly the orange—has taken place, due to Europe being short of supplies in the northern summer. Brazilian and other competition, however, is increasing. Oranges are largely cultivated under irrigation, particularly in the Transvaal and the Cape Town corner; Graaff Reinet and Upington are other centres. The south and east coasts are, however, well adapted to this crop. Vine-growing has made great strides, the Cape Province growing all this crop, mainly in the south-west corner; there is an associated production of wine and dried fruits. Deciduous fruits are mainly grown in this district; they are also being cultivated on the high veld, and an export trade is being built up. It should be mentioned that bananas are extensively grown in Natal, and the pineapple has been established as an important crop in various districts of the east and south.

Stock-rearing. South Africa is naturally a pastoral country, though it must be emphasized that the irregular rainfall is frequently responsible for heavy losses, especially of small stock. There are now over 11½ million cattle in the Union, including 5 million in native hands, partly owned by squatters on European farms, but mainly in the reserves. The highest cattle density is in the better-watered eastern districts of the Union. For draught purposes the hardy native animal is still the basic stock, but for other purposes considerable introductions of European breeds have been made. Cattle diseases are to a large extent under control, and the Union now meets its requirements in beef and dairy produce, and has built up a small export trade in these; there has long been an export of hides. The concentration

AFRICA

of cattle is in the regions with more than 20" of rain, and in many districts streams are dammed to preserve summer rainfall for watering the stock. For dairying purposes the high veld, the hinterland of Port Elizabeth and East London, and the irrigated districts of the Cape Province are most favourable. Maize-growing tends to promote beef production, but the improvement of pastures and the more general growing of fodder crops would benefit it more. A feature of the cattle-rearing of the high veld is the movement of stock in the dry and cold winter to the bush veld (low veld) by the Limpopo, which is unhealthy in summer.

There are some 40 million sheep in the Union; they are mainly woolled sheep, and all but 5 million are on European farms. The Cape sheep is a hardy, fat-tailed animal, but European breeds have been introduced for wool production. Merino stock predominates, for which dry pasture and sunshine are suitable. The annual wool clip now exceeds 200,000,000 lb., and although the Australian standard of quality has not yet been reached, the conditions in the two regions are very similar in many respects, and South Africa is now one of the world's big producers, averaging well over a quarter of Australia's production of merino wool. Water-conservation is an important problem, and on the high veld in the Transvaal the winter conditions are unfavourable. The greatest density of sheep is found in eastern districts of the Cape Province, in the southern part of the Orange Free State, and in the region where the Orange Free State, Natal, and the Transvaal meet. Water-storage is an essential feature on the sheep-farms, which are usually very large; if the water problem were solved many more sheep could be kept in the drier north-west of the Cape Province; artesian water in Namaqualand has helped to promote this, while underground water in other semi-arid areas is being developed. The sheep density in the drier districts falls below 1 per 10 acres.

The native goat—which has been slightly improved in quality—is of little value except as a local food; it thrives under very dry conditions, and is useful when trained to lead flocks of sheep. The Angora goat has been introduced, and

SOUTH AFRICA

is successfully established, particularly in the Cape Province. Angora goats are not so numerous as other breeds (about 15 per cent. of the total of some 6 million); the number varies considerably with the rainfall, the variation having a corresponding effect upon the export of mohair and goat-skins, while low prices for mohair have in recent years led to a great reduction in the number of Angora goats. The Karoos—more particularly the Great Karoo—have the largest numbers.

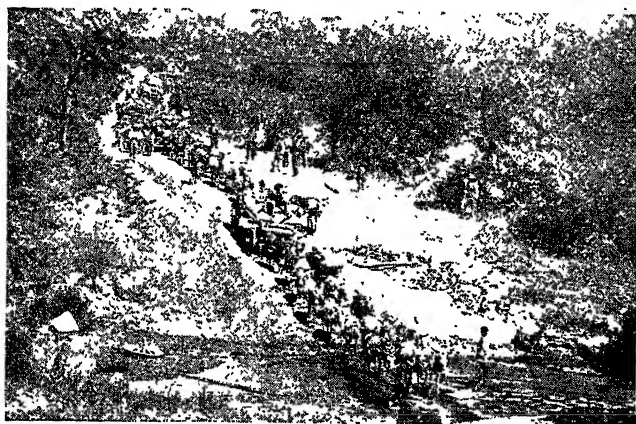


FIG. 110. DONKEY TRANSPORT

The hardy and disease-resisting donkey is a useful draught animal.

Union Castle Line

The rearing of pigs is developing, especially in some of the maize-growing districts and in the irrigated areas where lucerne is grown and dairying carried on; the production of bacon has steadily increased. The same is true of poultry-keeping. It is interesting to note that the introduction and keeping of rabbits in the Orange Free State and the Cape Province is severely restricted by legislation. The menace to agriculture which the rabbit constitutes in Australia should be remembered.

The horse was the first domestic animal to be introduced, and to it the European largely owes the establishment and

AFRICA

development of his supremacy in South Africa. Horse-breeding is not, however, very important, largely owing to the prevalence of horse-sickness, against which inoculation and dipping are imperfect preventives. The type known as the 'Cape horse,' which had a strong Arab strain and was hardy and sure-footed, has been at different times in demand for Australia (which obtained its first horse stock from South Africa), India, and neighbouring parts of South Africa. Its numbers were greatly reduced during the South African War, and the old 'Cape horse' type has been somewhat modified since then, so that the Arab strain, for example, is not so prominent. The development of motor transport is restricting horse-breeding to-day. The donkey, on the other hand, seems to be increasingly bred; it is more resistant to the tsetse fly, and is immune from horse-sickness. It is stated that a team of twenty donkeys will pull a load of 2 tons about 10 miles a day, and, despite its small size and slowness, it is an economical animal, especially in drier regions. Mules are not numerous, but are valuable; they command a higher price than horses, and are somewhat more resistant to disease. 'Salted' animals, which have recovered from disease, are much more valuable than 'unsalted' ones.

The ostrich was for many years the mainstay of a large number of South African farms. A number of wild ostriches still exist, but breeding has been practised for half a century. North African ostriches have been introduced. Breeding is by incubation, and chick-rearing is associated with lucerne-growing, the Little Karoo behind Grahamstown being of particular importance. But the industry has fallen on evil days, largely owing to changing fashions, and the export value of ostrich feathers—which was nearly £3,000,000 in 1913—has fallen below £30,000. It has been found possible to tan ostrich skins, though this can hardly save the industry.

Fishing. Until recently this industry had little importance. Formerly chiefly in the hands of Malays, people of many nationalities now engage in it, including Sicilians and Maltese. For the South African market as well as for export purposes fishing is concentrated at the major ports. Though

SOUTH AFRICA

fish are fairly plentiful in the warmer waters, especially on the shallow Agulhas Bank (running parallel to the coast between Cape Peninsula and Port Elizabeth), they are extraordinarily numerous in the cold waters of the Benguella Current, where cormorants, gannets, and penguins are estimated to consume annually the equivalent of 2 tons of fish per head of the white population of the Union. Important fish include the Cape salmon, the stockfish (hake), and varieties of herring and mackerel, while sole is plentiful on the Agulhas Bank; oysters are found, and the crayfish caught in Table Bay have given rise to a substantial canning and export trade, chiefly to France. Modern steam- and motor-trawlers, as well as sailing-boats, are utilized, and the fishing industry is being encouraged by the Government; nevertheless, there is room for considerable expansion, for it does not as yet meet the requirements of the home market.

Whaling companies operate from Cape Town, Durban, and South-West Africa. Whale-oil, whale-manure, and a kind of meal are all obtained, the first being of greatest value, but the production has fluctuated considerably. A little sealing has been carried on off the west coast, where penguin eggs are collected from certain island reserves for the Cape Town market. The guano industry of South-West Africa continues along the coast.

Mining. The exploitation of the mineral wealth of the Union is little more than sixty years old. The first mining company was floated in 1863 to work the Namaqualand copper area, and in 1867 the first diamond was discovered. In 1873 the first mined gold was won. The events arising from these discoveries have moulded the history of the Union, and now South Africa is not only the premier producer of gold, as it has been of diamonds, but is developing other important mineral resources. It is important to mention in regard to the winning of these minerals that only large-scale company production has in general been possible; alluvial diamonds, however, have latterly given much scope to the individual digger. The big companies, further, are able to a great extent to control output and price—*i.e.*, to stabilize the market for their product. The demand

AFRICA

created by mining development for agricultural products and for machinery and stores from overseas, as well as for modern transport development, is a most important factor in the general prosperity of the Union. The railway network, in particular, largely reflects the distribution of important mineral wealth, while the mining industry contributes directly or indirectly a large proportion of the Union revenues.

The dependence of the mining industry upon native labour is illustrated by the fact that the Transvaal gold-mines employ at the present time nearly 400,000 workers, in the proportion of 1 white to 8 natives. The former retain the skilled work in their hands, and their rate of pay is six or seven times that of the native worker. It is, broadly speaking, true to say that the high mineral output is possible only because of the cheap unskilled labour available, which is, however, in some respects insufficient and unsatisfactory and not always easy to recruit in adequate numbers.

Gold. It is estimated that in the last seventy years gold

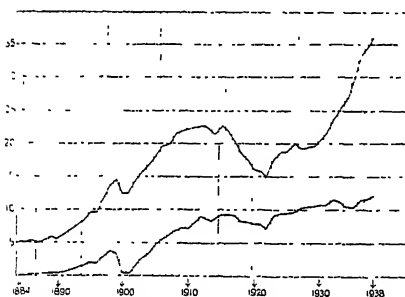


FIG. III. GOLD—UNION PRODUCTION
(LOWER CURVE) IN RELATION TO
WORLD PRODUCTION
In millions of fine ounces

to the total value of £1,657,000,000 has been won in South Africa. The proportion obtained from alluvial fields has been almost negligible, only one such field, in the Lydenburg district of the Transvaal, having proved really remunerative. Reef-mining commenced in the same district in 1873, but

extensive development waited upon the Rand discoveries and the foundation of Johannesburg in 1886. Here the gold exists in fine particles, microscopically crystalline in structure, embedded in the siliceous matrix of a series of ancient conglomerates, known as the Reef series, overlying granite in the Southern Transvaal. The dip of these beds at the surface is sometimes more than 70°, but at a reasonable depth

SOUTH AFRICA

this flattens to one varying between 10° and 30° . Mining is often very deep, and one shaft has been cut to a depth of more than 8000 feet. It is remarkable that the increase of temperature with depth, which averages 1° F. for 65 feet elsewhere in the world, is here only 1° F. for well over 200 feet. At 7103 feet the rock temperature has been found to be 94° F.; air-cooling and special airways are needed for working at such great depths. Miners' phthisis, due to dust, was a terrible scourge, but has recently been considerably reduced.

Much machinery, both on the surface and underground, is necessary for the mines, while the treatment of the 'banket' involves the use of heavy stamps, as well as of chemical processes—notably the amalgamation and cyanide process for the extraction of the gold. Much plant, operated from power-stations, is utilized, and the relative nearness of coal has been an important factor in this development. An enormous dam on the Vaal supplies the Rand with water.

Except on the Rand, where the mining belt is about 50 miles long, stretching from Randfontein to Springs, little gold is won. Some is worked in the Lydenburg district; a little comes from the Barberton area, once relatively important. The Rand's future is bound up with deep working and cheap labour; it is really a low-grade gold-field, profitable only with large-scale operations; its ultimate, though perhaps rather remote, decline as an asset seems inevitable. A ton of banket yields on the average only a few pennyweights of gold. The world's currency difficulties in the last few years have immensely stimulated gold production, leading to the exploitation of low-grade ore on the Rand. Whereas in 1932 the average yield of gold per ton was about 6.7 dwt., the operation of the gold premium had by 1938 made it worth while to work on the basis of a yield of 4.346 dwt. Despite a greatly increased production in recent years, the Rand's proportion of the estimated total world output has declined from over 50 per cent. in the period 1920-30 to 33.1 per cent. in 1938, when the Rand production was over 12 million fine ounces. On the Far East Rand (toward Springs) coal-measures overlie the gold-bearing reefs.

Diamonds. The first important diamond-workings were

AFRICA

developed in the rather arid region of Griqualand West, centring on Kimberley. This diamond area, at one time entirely in the Orange Free State, is now mainly in the Cape Province; it is controlled by the De Beers Company. A diamantiferous area extends from Koffyfontein and Jagersfontein, in the Orange Free State, to the famous Premier

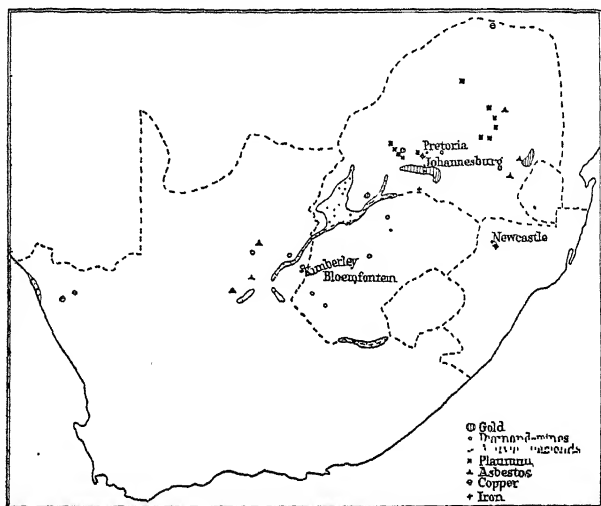


FIG. 112. UNION OF SOUTH AFRICA—DISTRIBUTION OF CHIEF MINERALS OTHER THAN COAL

Note the distribution of alluvial diamonds in relation to the Vaal and Orange rivers.
Based upon a map in the "Year-book of the Union of South Africa."

Mine, 25 miles east of Pretoria, in the Transvaal, the important workings being at these places. The diamonds occur in ancient serpentized volcanic dikes or pipes, which on the surface have decomposed into a clayey rock, known as 'yellow ground,' below which is a darker, hydrated rock called 'blue ground'; at a greater depth a comparatively unmetamorphosed rock is reached, known as 'hardebank.' The extraction of diamonds from all these, chiefly the blue ground, involves the disintegration of the rock and washing, followed by separation of the diamonds by means of petroleum jelly. The hardebank has presented the greatest difficulty.

SOUTH AFRICA

Since about 1926 the opening up of extensive alluvial fields, found near the junction of the Vaal and Orange rivers, at Lichtenburg, between Johannesburg and Mafeking, and in Namaqualand, near Port Nolloth, has been of great importance. Serious competition with the older producing areas has developed, especially as large quantities of alluvial diamonds have been obtained in South-West Africa, Angola, and the Belgian Congo, as well as in Sierra Leone, the Gold Coast, and British Guiana. Diamonds vary much in size and quality; the largest have come from the pipes, but these workings produce a vast number of small and inferior stones. Small stones find a market for industrial uses. The estimated total value of the Union production in 1928 was over £16½ million; in 1938 it was £3½ million.¹

Coal. Without being rich in coal, the Union has useful and cheaply worked resources. Some 2000 Europeans, 30,000 natives, and in Natal a number of Indians are employed in the coal-mines. Coal has been worked in the Storm Bergen of the Cape Province, but its inferior value has led to its being abandoned. In Natal collieries are found in the Vryheid, Utrecht, Newcastle, and Dundee districts; the coal is generally of good quality, and is conveniently situated for export from Durban. The Transvaal is a larger producer, the most important collieries being found in the

¹ Union diamond production about 1927 was employing about 100,000 persons (four-fifths native or coloured) and was yielding more than 80 per cent. of the world output. The control of such a largely luxury industry was complicated by the increase in alluvial production, especially as the stones found in South-West Africa and Namaqualand are of fine quality; the industry, however, was helped by heavy buying from the then prosperous United States. The Union Government works the Namaqualand field with white diggers, has power to control the output of alluvial diamonds, and, in conjunction with the Diamond Corporation, to control the sale of diamonds. Improvements in mounting diamonds for drilling purposes have helped to provide a market for inferior stones, which have largely displaced 'carbonado,' a black, amorphous variety from Brazil, for this purpose. In 1932 all the Union mines closed down, as did the alluvial workings in South-West Africa. The Union alluvial fields have maintained some production, and there has been in the last year or two some small resumption in South-West Africa, while one or two of the Union mines have reopened. It is difficult to bring about a general reopening of the mines, for alluvial diamonds are so plentiful and rich fresh sources are known in South-West Africa.

AFRICA

Witbank district, but others of somewhat lower quality are worked in the Springs, Middelburg, and Ermelo districts and near Vereeniging. The Rand's development has largely depended on the Transvaal coal. The Orange Free State has large areas of inferior coal, and the projected railway from Lourenço Marques through Swaziland is expected to open up what may prove to be an important coalfield in

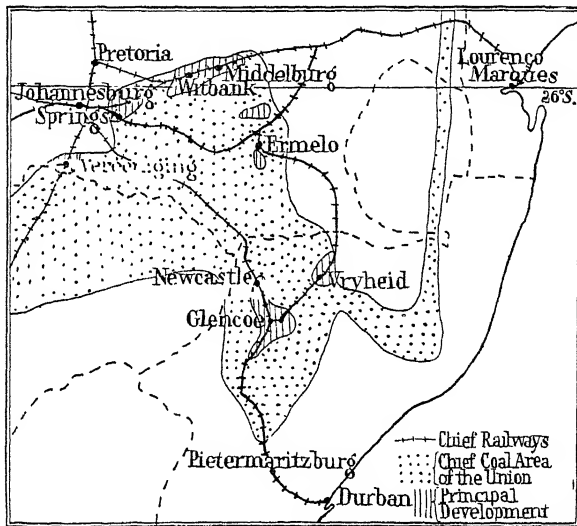


FIG. 113. UNION OF SOUTH AFRICA—COAL

Based upon a Union Government map

that territory. The total annual output of the Union is about 17,000,000 tons.

Other Minerals. Copper production, once very important, has declined in the Ookiep district, in the north-west of the Cape Province, as the best ore seems to have given out; recently, however, fresh development work has been carried out. A rich mine near Upington had to be abandoned owing to transport difficulties; elsewhere copper is seriously worked only near Messina, in the low veld of the Transvaal, where malaria has badly hindered production. Tin ore is obtained some 40 miles south-west of Pretoria. High-grade asbestos is worked in the Carolina and Pietersburg districts

SOUTH AFRICA

of the Transvaal, and near Prieska, in the Cape Province, but the output is considerably below that of Rhodesia. A considerable development of platinum production has taken place from important deposits in the Lydenburg, Pretoria, Potgietersrust, and Rustenburg districts. Nickel may also prove important in the last-mentioned area. Iron ore is plentiful in the Transvaal and Natal; there was early development of this mineral in the Newcastle district, where local coal and limestone are utilized in a smelting industry, but this has been exceeded by the Transvaal production, especially north of Rustenburg. Corundum and lead have had some importance in the Zoutpansberg area of the Transvaal, and a manganese field has been opened up near Postmasburg, in Griqualand West; but although many other minerals occur in various parts of the Union they are at present of little economic value. It should be noted that a good deal of silver is secured as a by-product of gold and base-metal extraction and is sent to India. A large amount of salt is obtained by evaporation from interior pans.

Manufacturing Industries. As in other 'new' countries, factory industries are relatively unimportant but, as elsewhere, are developing behind, in many cases, a protective tariff. The lack of sufficient skilled labour to secure the home-market in competition with old-established industrial countries is the chief difficulty. The Great War of 1914-18 provided a certain stimulus, as then imports were restricted, and recently there has been considerable expansion. From the point of view of power-supply, the Rand-Witbank area and the Natal coalfield have cheap fuel available, and the mining development of the former with that of Vereeniging has led to the creation of a group of stations equipped to supply an enormous amount of electricity and compressed air; this power is controlled by the Victoria Falls and Transvaal Power Company, which has the concession for the development of the energy of the Victoria Falls. There is very limited scope for water-power utilization in the Union, largely because the river *régime* is unsuitable. A feature of the manufacturing industries is the large proportion of European employees—some 40 per cent. of the total.

AFRICA

In the Rand area there are factories connected with the manufacture of explosives, cement, soap, flour, hardware, and railway necessities. Pretoria is also developing industrially, and possesses the large and modern State Iron and Steel Works as well as important railway workshops. Milling and the preparation of foodstuffs from the hinter-

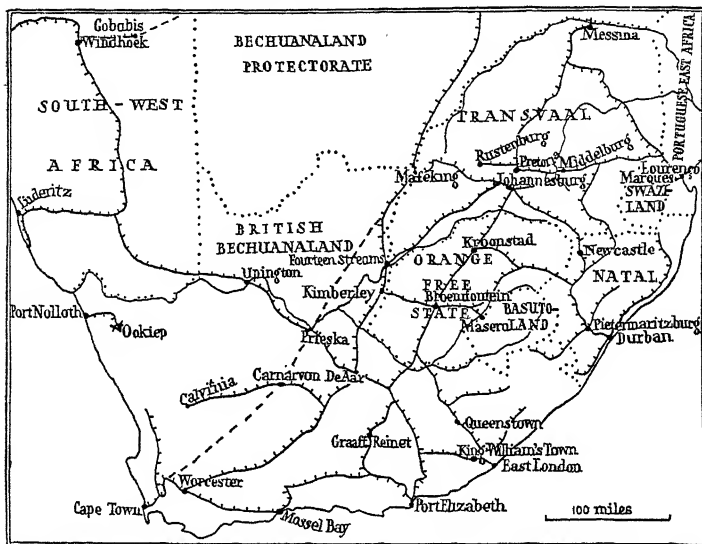


FIG. 114. UNION OF SOUTH AFRICA—PRINCIPAL RAILWAYS
A suggested new main railway is shown by the broken line.

land cultivations are activities associated with Cape Town. Wool-washing is established at Port Elizabeth and Uitenhage; the former has tobacco, clothing, leather, and motor industries, while East London is similarly developing; Durban has industries connected with sugar fibres, whaling, and leather; at Umbogintwini, about 12 miles south of Durban, are works dealing with maize and other products. This area is developing many new industries. Brewing, condensed milk, and explosives are other manufacturing interests. There are many local factories, mostly small, with varied interests; of general importance are occupations

AFRICA

are State-owned. The British air-mail route reaches the Union, *via* the Nile and the east coast of Africa, at Durban. The chief interior air port and junction is Germiston; Kimberley and Bloemfontein are subsidiary ones.

Although there are some 85,000 miles of highways (35,000 with hard surface), there is not a close network of roads. The farmer has, in the main, only tracks at his disposal, but the rapid development of motor transport (the number of motor-vehicles averages one to every 5·5 of the white population) has led to increased attention to highways. On the veld the ox-wagon still crosses the rivers at 'drifts,' picks its way through 'neks' and 'poorts' or along 'kloofs,' and 'outspans' at the 'fonteins.' And although the more prosperous farmer now possesses a motor-car which is not subject to horse-sickness, many country burghers still measure distances in 'hours'—*i.e.*, the time taken to ride the distance in question, an 'hour' being roughly equivalent to 6 miles.

Overseas communications are confined almost exclusively to the ports already mentioned, and of these Cape Town and Durban share the bulk of the tonnage. The table given on this page shows the relative importance (in 1938) of the ports in regard to the value of the goods handled. More than half the trade (in value) is with Great Britain. Cape Town has a dominating position on a very important route between Europe and the Indian Ocean, besides having important connexions with North and South America. Durban has a substantial trade with India. A considerable amount of *entrepôt* trade for Rhodesia passes through Union ports.

PORT	IMPORTS PERCENTAGE OF THE TOTAL	EXPORTS PERCENTAGE OF THE TOTAL
Cape Town . . .	23·53	69·34
Durban	34·63	11·14
Port Elizabeth . .	21·28	5·49
East London . . .	8·68	3·35
Lourenço Marques ¹ .	9·12	4·5

¹ This Portuguese East African port is added for purposes of comparison.

SOUTH AFRICA

With regard to the bulk of goods landed and shipped, Durban handles far more than Cape Town, for it deals with bulkier products. Although the shipping tonnages entered and cleared at these two ports are very similar, it should not be forgotten that Cape Town dominates as a port of call and as a port of shipment for most of the valuable but not very bulky gold and diamond exports. To compare Cape Town and Durban as regards shipping and trade, reference should be made to the tables on p. 355.

The Transvaal

The Transvaal lies between the Vaal and the Limpopo, and physically consists chiefly of high veld (over 4000 feet), with large areas above 5000 feet, including the Witwatersrand and the Skenkamps Berg, which may be regarded as the most northerly extension of the Drakensbergen. The low veld (below 3000 feet) lies by the Limpopo in the north and along the frontier of Portuguese East Africa. The middle veld is the name applied to the slopes or 'banken' by which the high veld falls to lower elevations. The rainfall is heaviest toward the east, and is least by the Limpopo. There is little surface-water, but water-holes and springs are common. Although mainly a grass-land, and naturally a stock-rearing area, there is a tendency to forest in the high east, while the bankens are often relatively well-watered, and provide most of the agricultural land. The low or bush veld is avoided for pastoral purposes in summer because of its unhealthy character, and the higher land of the Zoutpansberg district is much less healthy than the high veld to the south. The Transvaal does not lead in any branch of agricultural production—except, perhaps, maize—but its mineral resources have determined the course of the modern communications and economic development of the Union as a whole.

Johannesburg (530,000 population, 54 per cent. of whom are white) may be regarded as the centre of the railway-system. It began in 1886 with a few shanties on a bleak and poor upland. To-day it is a modern, well-laid-out city, extra-

AFRICA

ordinarily cosmopolitan in character, and is the commercial hub of the Rand. It has important railway connexions through Germiston (population, 82,000), to the east, where there are factories associated with gold-refining, milling, explosives, engineering, soap, cement, and cotton-ginning. A little farther along the line from Johannesburg to its nearest port, Lourenço Marques, 390 miles distant, is the coal-mining

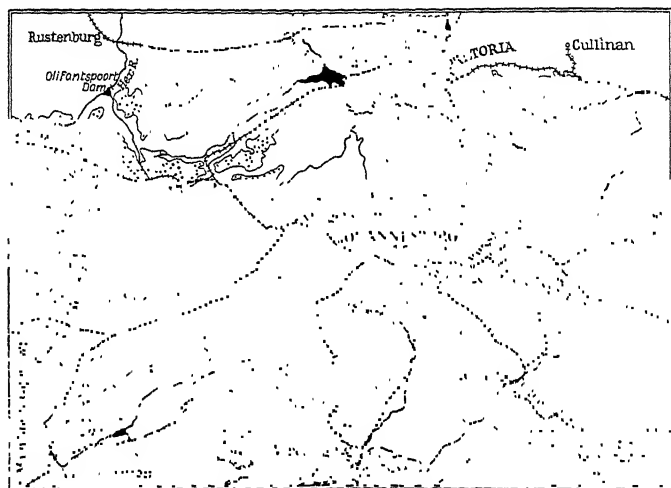


FIG. 115. THE WITWATERSRAND

Note the Vaal Dam, which is the center for the Rand's coal exports. The map shows several storages for irrigation. The Vaal Dam is situated 10 miles above Vereeniging. The Vaal Barrage is situated for the Van Rietz irrigation scheme near Fontein. The Vaal Dam is the center for the Rand's coal exports. The Vaal Barrage is situated below Vereeniging.

district of Brakpan and Springs. Beyond that is the important Witbank-Middelburg area, where are situated the Transvaal's most productive collieries; these have an annual output of more than 8,000,000 tons, some of which is turned into coke and some exported *via* Lourenço Marques, reached through Komati Poort. There are railway links with Lydenburg, where platinum is exploited; with Barberton, an old gold centre, now growing cotton and citrus fruits; with Carolina, where coal and asbestos are worked; with Bethal, in a rich maize area; with Ermelo, a developing coal area; and with Piet Retief, an outstanding centre for tobacco and stock-rearing.

SOUTH AFRICA

The line to Durban, 480 miles distant, passes through the fine pastoral and agricultural country round Heidelberg and Standerton, a region important for maize and oats, as well as for cattle, sheep, and horses; dairying is developing here.

Northward from Johannesburg Pretoria (population, with suburbs, 130,000, 62 per cent. of whom are white) is soon reached. The seat of government of the Transvaal and the Union, this is now a modern city, the centre of a fertile region with several irrigation schemes, including the Hartbeestpoort Dam. The city lies in a valley sheltered from bleak winter winds. It has owed much to the Premier Diamond Mine 25 miles away. Apart from the market-gardening and tobacco-farming for which the district is important, huge State iron- and steel-works have been established a few miles west of the city. Railway-repair shops and cement works are among the industries. Beyond the railway reaches Nylstroom, where platinum is being worked, situated in the maize-growing district of the fertile Springbok Flats, and Pietersburg, an important centre for dairy-farming, in a region not only rearing many cattle, but growing cotton, tobacco, and ground-nuts, while gold, tin, and asbestos are all found there. The line goes on through the Zoutpansberg country to Messina, by the Limpopo, with important copper-mines and smelting works; the river is bridged here for the railway. From Pretoria a branch line goes west to Brits and Rustenburg; the latter is in one of the most important agricultural areas in the Union, where tobacco and citrus fruits are grown and cotton seems to be well established, and where platinum, nickel, and chrome ore are worked, and thence north to the Crocodile river, where rich iron-ore deposits supply the Pretoria ironworks.

West and south-west from Johannesburg lines run through Zeerust, Lichtenburg, and Bloemhof; these farming centres are in an area that has been important for alluvial diamonds. Nearer to Johannesburg is Potchefstroom, an old settlement, dating from 1839, on the main line to Cape Town and on the Mooi river, where irrigation is leading to important agricultural and dairying occupations. The main line to

AFRICA

Bloemfontein reaches the Vaal at Vereeniging, which has developing power and iron industries based upon local coal and iron ore.

The Orange Free State

This lies between the Orange and the Vaal; except for a small area in the west, it is entirely over 4000 feet and largely

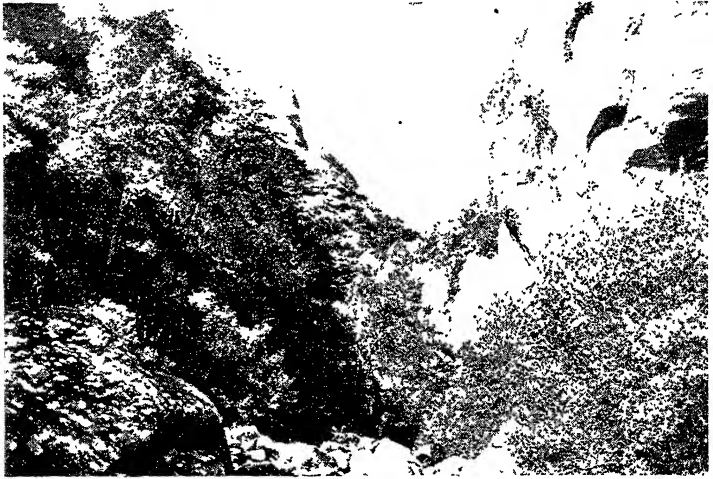


FIG. 116. CATHEDRAL SPIRES, DRAKENSBERGEN

There is magnificent scenery for tourists in the Natal National Park (Mont aux Sources district).

Union Castle Line

high veld. The eastern boundary is marked by the Drakensbergen and the Basutoland border, along which the Caledon flows for a considerable distance. Other rivers have little importance, although the Riet is used for irrigation to the south of Bloemfontein. The rainfall decreases westward, and the eastern districts are therefore more favourable for cultivation, the Caledon valley being called "the granary of South Africa." Wheat is very important in this area, while the 'maize triangle' projects into the northern part of the state. But the Orange Free State is mainly pastoral in character, sheep in particular being extensively reared.

SOUTH AFRICA

Although in certain localities minerals are exploited, the Orange Free State lacks the great mineral development of the Transvaal, and as a consequence the settlements are, broadly speaking, on a more modest scale than those in the Transvaal. The capital is Bloemfontein (63,000 inhabitants, nearly half whites), which began as a village centre for the 'voortrekkers.' It is a residential and educational centre, with milling, wagon-building, and engineering industries, in the middle of a pastoral country rearing sheep, goats, and cattle, and containing several irrigation enterprises. The railway into the Transvaal passes through Glen, the centre of the Bloemfontein River Settlements, with typical irrigation development, and reaches Kroonstad, a railway-junction in a rich maize and tobacco area. From Kroonstad a branch runs eastward to Bethlehem, with railway-workshops and grain-elevators, a junction for the important maize and pastoral centre of Frankfort, on the Wilge river, which supplies most of the water stored behind the Vaalbank Dam. The line reaches the Natal frontier just beyond Harrismith, in a healthy, well-watered upland area. This town has a small woollen industry, and is a good centre for the impressive Mont aux Sources scenery.

East from Bloemfontein railways give access to Ficksburg and Wepener, important agricultural centres in the Caledon valley, and convenient for trade with Basutoland.

From the Cape Province the main line to Bloemfontein passes through Springfontein, junction for the railway for the old diamond centres of Koffyfontein and Jagersfontein.

Natal

Physically and climatically Natal, the smallest province, has characteristics which give it a unique position in the Union. With an average width of about 150 miles, it rises from the Indian Ocean to the divide made by the Quathlamba and Drakensberg mountains, where the heavy rainfall and rapid erosion have deeply cut into the highlands and created scenery of rugged magnificence. Numerous rivers dissect the country at right angles to the coast. Zululand, with relatively few, lies north of the Tugela. The narrow

AFRICA

coastal plain, the warmest belt, having a heavy summer rainfall, has many fertile areas producing crops tropical in character ; it may be regarded as finishing at an elevation of 1000 to 1500 feet. The midlands, rising to 4000 or 5000 feet, are warm-temperate in character, and have the corresponding products ; they seem to have a somewhat smaller

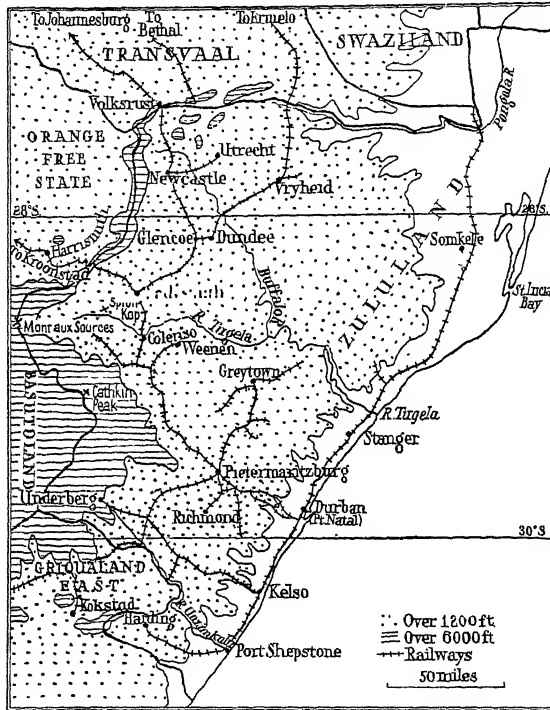


FIG. 117. NATAL

rainfall than the coast plain (Pietermaritzburg, 36"; Durban, 45"), but retain important forest areas, as well as being largely planted with wattle, a species of acacia, which not only yields tanning extract, but also timber in great demand in the mining districts. Cattle-rearing is more important here than on the coast. The highlands constitute a cool-temperate region, with pasture green nearly all the year

SOUTH AFRICA

round—very important to the high veld farmers. Well-marked steps separate these three main physical divisions of Natal. The whole country is rich in reminders of Chaka and Dingaan.

Transhumance in Natal is declining. Some movement of cattle from the highlands to the midlands takes place in autumn, but attempts to restrict the incidence of cattle dis-



FIG. 118. ZULU HUTS

Note the rolling, open veld.

Union Castle Line

ease and the increasing cultivation of winter fodder are tending to limit this migration. Many sheep still come in the autumn over the Drakensbergen to pasture at the eastern foot of the mountains, but increasing fencing of land along the stock routes and measures to prevent the spread of scab have caused a great reduction in the number of flocks moving in this way.

Harbours, with the exception of Durban, are poor. This city (with suburbs, 260,000 inhabitants, over half natives, coloured and Indians) is situated at the mouth of the Umgeni river, the bar of which has been removed so that 36 feet of water are available and very large ships can come alongside the wharves. It was founded in 1824; its immediate

AFRICA

hinterland is rich with orchards growing the orange, banana, pineapple, mango, and other fruits. Its railways bring maize, wool, coal, wattle, sugar, and meat, providing for typical industries, which also include the manufacture of cordage, soap, furniture, and explosives. Durban is also an increasingly popular holiday resort for the Rand. In addition to exporting much coal, it supplies a good deal to ships for bunkers. The railway northward runs through the sugar belt, where banana, tea, cotton, and tobacco cultivations are also carried on. It passes through Stanger, the centre of most of the remaining tea-plantations, on the site of the royal kraal of Chaka, and enters Zululand, where sugar-growing has greatly increased. Passing Somkele, it goes northward to the Pongola river, where cotton is grown and rubber cultivation attempted, and reaches the Swaziland border. Cattle-rearing is here somewhat hindered by 'fly' belts. The sugar area continues southward from Durban, passing through Umbogintwini, making maize products and fertilizer, and Kelso, where fibres and cotton are grown, to Port Shepstone, a centre for all the typical coastal products, but with a now abandoned harbour.

Inland the railway runs to Pietermaritzburg (50,000 inhabitants, nearly half of them white), the capital. This is in a wattle-growing and dairying country; its industries include wattle extract, furniture, confectionery, leather, and brewing. Beyond, the railway runs through an area growing temperate cereals and rearing cattle, passes Colenso, which has the power-station for the electrified railway, and reaches Ladysmith, a junction for the Orange Free State. Northward the coalfield is reached at Glencoe, near which is Dundee, not far from Rorke's Drift, and with small industries. A branch goes on to Vryheid, still an important centre for winter sheep-pasture, but now developing local supplies of coal and iron and situated in an important wattle area. The main line for the Transvaal crosses the boundary near Majuba Hill, having passed through the growing industrial centre of Newcastle, with iron-smelting works, as well as timber and dairying occupations. From here a branch runs to the collieries of Utrecht.

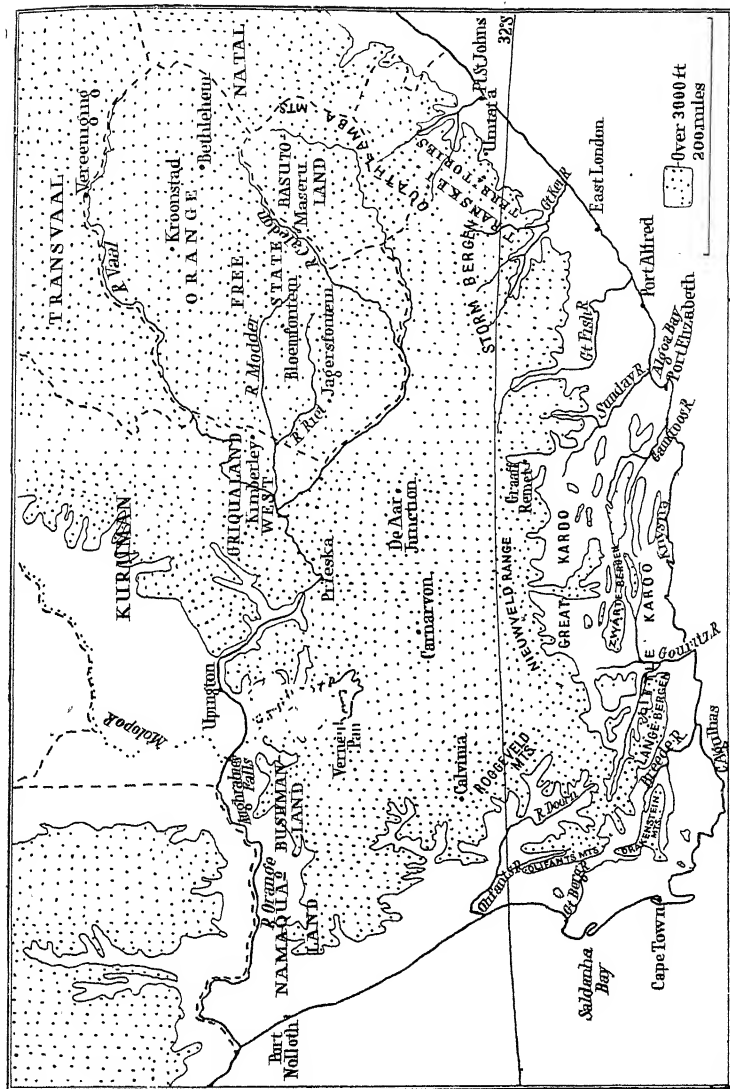


FIG. 119. FEATURES OF THE CAPE PROVINCE
Note the Karoos and the drainage in the south.

AFRICA

The Cape of Good Hope

The varied relief and climate of the Cape of Good Hope, the largest province, have already been analysed. The good rainfall in the south-west and south is limited to a narrow coastal belt, which, however, considerably widens in the east. The southern belt is remarkable for the large number of rivers that cut across the Karoos and the bordering ridges; these provide the water for many irrigation schemes, mostly small in character, but of great local importance. The relatively moist conditions of Natal continue into the Transkei Territories, but the Karoos and the whole north-west area, including British Bechuanaland, Great Bushmanland, and Namaqualand, constitute a semi-arid or arid region, dotted with salt-pans, through which runs the Orange River. This dry area is precariously pastoral, and thinly populated, except where local conditions permit of irrigation. It is not surprising that the Cape Province leads in the rearing of sheep and goats; it is also noteworthy that maize is relatively unimportant, but the bulk of the Union wheat is grown in the Cape Province, with the assistance of the winter rain. Mining activity, too, is not very prominent. The population is densest along the southern margins, especially centring on Cape Town and King William's Town. The rivers are silted along the coast, and there is no good natural harbour, except the arid Saldanha Bay. Cape Agulhas, the most southerly point of Africa, was the scene of the famous *Birkenhead* wreck; its longitude (20° E.) is recognized as the dividing line between the Atlantic and Indian Oceans.

Cape Town (with a population of 336,000, 52 per cent. of whom are white) began as a watering-place for ships. It owed this not to any excellence in the shelter it provided, but to the fact that it was the first possible place for ships to water after passing the arid coast of South-West Africa. Its hinterland proved eminently suitable for settlement, and subsequently it was found to be relatively easy to penetrate the valleys and the plateau to the east. Historically it is the most important city in South Africa.

Table Bay has witnessed many wrecks in the past; shelter

SOUTH AFRICA

is now provided by a breakwater nearly 5000 feet long, and extensive harbour improvements have been carried out.

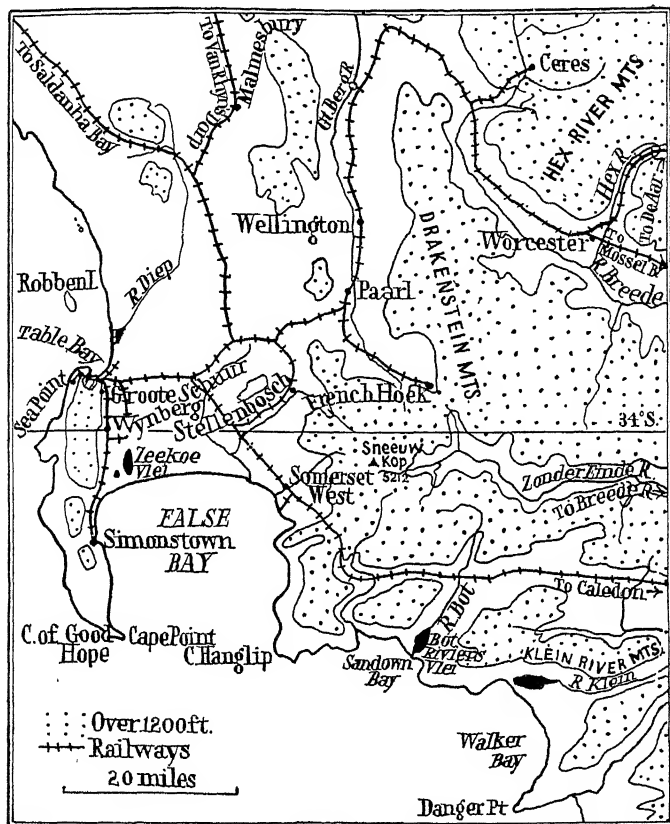


FIG. 120. THE IMMEDIATE HINTERLAND OF CAPE TOWN

The main line to De Aar takes a devious route *via* the Hex valley on to the plateau.

Wharfage is provided with a depth of 36' 6". The beautiful suburbs of the town climb the lower slopes of Table Mountain. The typical products of its hinterland are illustrated by a huge grain-elevator and a fruit-cooling installation. As the nearest port to Europe, with which the bulk of South African

AFRICA

trade is carried on, and served by a trunk-line leading into Central Africa, Cape Town is an important liner and passenger port, a coaling-station on the route to the Far East and Australia, besides being an outstanding intellectual centre and pleasure-resort. The Cape Peninsula is a veritable playground, and the growing tourist traffic of South Africa as a whole passes mainly through Cape Town. It has a considerable *entrepôt* trade, and its fishing and whaling occupations have already been referred to. On False Bay is Simonstown, a naval station, from which the annual mail to Tristan da Cunha, now discontinued, used to be sent.

The agricultural Cape corner is strictly limited by the Olifants and Lange Bergen. Here temperate cereals and fruits, grown both on the winter rainfall and under irrigation—especially grapes and oranges, but including also deciduous varieties—are extensively cultivated. Wine and brandy are made, and jam-making and fruit-drying carried on. Important centres are Clanwilliam, Malmesbury, Worcester, Ceres, Robertson, Wellington, and Paarl (famous for its wine and tobacco), as well as Stellenbosch, with a university, and next to Cape Town the oldest Dutch settlement in South Africa. Somerset West has a large explosives factory, and produces fertilizer and sheep dip, while Caledon is in a district rich in everlasting flowers and Cape heaths. Farther east Swellendam, on the Breede river, is a market for ostrich feathers and wool. Northward from Cape Town a line runs to the neighbourhood of Van Rhyn's Dorp, a pastoral centre in a region of low rainfall. Large irrigation works have been constructed some distance away on the Olifants river. This line passes through Malmesbury and near Clanwilliam; before reaching the former place it sends a branch to Saldanha Bay.

Within 36 miles of Worcester (794 feet) the main line from Cape Town rises to 3193 feet, in the extreme west of the Great Karoo. This is a dry merino-sheep country, for which Beaufort West, at the foot of the Nieuwveld Range, is the market. Goats, ostriches, and cattle are reared in the high veld, where, at the important railway-junction of De Aar, the lines from Port Elizabeth and from South-West Africa

SOUTH AFRICA

join. The line goes on to cross the Orange into Griqualand West. Here salt is obtained from pans. The outstanding city of the district is Kimberley (44,500 inhabitants in 1931, 40,200 in 1936), which was for a time the largest interior settlement. The diamond workings here took the form of deep excavations, but so much rock fell in on the claims that underground mining became necessary. The railway crosses the Vaal at Warrenton, near which is the diversion weir for the Vaal-Hartz irrigation area; then Fourteen Streams, the junction for Johannesburg, and the pastoral centres of Vryburg and Mafeking are reached, the latter being an important railway depot, with a cattle trade with the Rand.

Eastward from Cape Town a railway reaches Mossel Bay, a resort situated in magnificent country and with important oyster-fisheries. From here a line reaches Oudtshoorn, on a tributary of the Gouritz, the most important town of the Little Karoo. In this district a considerable acreage is irrigated, and the town is important not only for fruit, grain, brandy, tobacco, and vegetables, but also for dairy products, wool, and mohair.

Between Mossel Bay and Port Elizabeth is Knysna, in a forested region, and with a considerable coastal trade in yellow-wood. This is an excellent tourist district. In the forests elephants and leopards are still found.

Port Elizabeth (125,000 inhabitants, nearly half of them white) is the third port of the Union. On Algoa Bay, it has a modern harbour. Its immediate hinterland is the irrigated Sundays River valley and the Great Karoo, but, beyond, the railway gives it access to the high veld and the Orange Free State. Its chief trade is in grain, wool, mohair, and feathers, but it has milling, soap, motor, jam, confectionery, and tanning industries. Uitenhage is a large town in an irrigated district just north-west of the port; it has railway-works and wool-washing factories. On the Sundays River is the big Lake Mentz irrigation scheme, which serves the crops common to irrigated districts. The chief town of the Great Karoo is Graff Reinet, on the Sundays River, an oasis in the arid Karoo, important for cattle and sheep farms; a few miles above the town is the Van Rhyneveld's Pass irrigation

AFRICA

scheme. Northward is the high-veld junction of Middelburg, from which De Aar and Bloemfontein may be reached.

Behind the now disused Port Alfred, in which district pineapples and oranges are grown, is the large and important city of Grahamstown, a centre for dairying and ostrich-farming, with legal and ecclesiastical interests.

East London (population, 60,000, half of which is white), at the mouth of the Buffalo, is the next port from the point of view of trade. With a good modern harbour for fairly large vessels, it is the chief wool port of the Union, and handles a good deal of citrus fruit and dairy produce. It also serves the Transkei Territories, and there is a fishing industry. Inland is King William's Town, an important centre on the Buffalo. Forests of yellow-wood and stink-wood (the latter resistant to the white ant) remain. A large native trade is carried on, cattle and sheep are reared, and wagons, soap, leather, and boots are manufactured.

Queenstown, farther north, is in a sheep-rearing and wheat-growing area; Molteno was once a colliery town, and Aliwal North, on the Orange, is a market for an area of high veld.

Mention should be made of the small Port St. Johns, on the Pondoland coast. There is no railway at present, but its river has an irrigation scheme, and the district is now growing excellent cotton.

From De Aar the railway to South-West Africa runs to Prieska, on the Orange, near which asbestos is worked and alluvial diamonds found, and where oranges and grain are grown with irrigation; it then crosses the river at Upington and continues west (p. 304). Near Upington the Orange river-flats can be irrigated by channels from the river, and citrus fruits are cultivated. Some 60 miles to the west the Orange River plunges 400 feet over the Aughrabies Falls, above which an irrigation dam is to be built.

Ookiep, in Namaqualand, grew up on copper-mining until 1918, when the works closed down, though immense quantities of low-grade ore remained. Mining was resumed in 1938, but otherwise there is only a poor pastoral country to depend on, and little call for the railway to Port Nolloth.

SOUTH AFRICA

Some fishing and digging for alluvial diamonds in the district have helped to improve the position of this port.

The pastoral occupations of Kuruman, Gordonia, Bushmanland, and Namaqualand are being assisted by borings to tap underground water. Two important centres, Carnarvon and Calvinia, lie on the southern fringe of the arid region; some irrigation is carried on, and grain is grown.

The Transkei Territories

The Transkei Territories (Griqualand East, Pondoland, Tembuland, and Transkei) lie south of Natal, and cover 16,351 square miles. The population consists of 17,000 whites (chiefly in Griqualand East) and over a million natives, who are increasing considerably. The whole area is often wrongly called Kafraria, but this name should properly be applied to the immediate hinterland of East London. The territories are mainly reserved for the natives; they are for the most part fertile, well-watered upland, very similar to the midlands of Natal. Cattle and sheep provide the chief occupations, the amount of grain grown sometimes being insufficient for the native needs, though the maize crop is usually heavy. Pondoland is the least touched by white influence. Administered by the Union Minister for Native Affairs, the region has its chief centres at Butterworth, in the Transkei, and Umtata, in Tembuland, on the railway served by East London.

Swaziland

This native territory is administered under the High Commissioner for South Africa. It covers 6704 square miles, and has a population of about 153,000 natives (related to the Zulus) and 2700 Europeans. Jurisdiction over the natives is in the hands of native chiefs. The greater part of the area, which exceeds 5000 feet in the west, may be described as thorn veld; it drains eastward to Delagoa Bay. The mean rainfall is well over 40", giving excellent pasture all the year round, except in the lowland to the east, a

AFRICA

malarial country deficient in rainfall. Both Europeans and natives are interested in maize and tobacco; Kafir corn is a native crop in the bush-veld of the east. The area under cotton (a European crop) is not increasing. There are also considerable numbers of native cattle, sheep, and goats. Many sheep are brought here in winter from the Transvaal and Orange Free State. Alluvial tin is worked near M'babane, and in the lowlands is an anthracite field that it is



FIG. 121. PONDO HUTS

Contrast the shape of these with that of the Zulu huts illustrated on p. 343.

Union Castle Lane

hoped will be developed by the continuation of the railway that reaches the frontier from Lourenço Marques.

The administrative centre is M'babane, in the west. Native education is subsidized by the Union. The Union also controls the Customs, so that import figures are not available. The principal exports are slaughter cattle, tobacco, cotton, and tin; the total value in 1938 was £100,000 (much declined). Most of the trade is *via* Lourenço Marques. There are a few motor-roads, but transport is chiefly by carts, donkeys, and runners. Many natives are recruited for the Rand.

SOUTH AFRICA

Basutoland

Situated west of the Quathlamba divide, Basutoland is an important native area, in which European settlement is in general prohibited, under the High Commissioner. The region covers 11,716 square miles, and has a population of 560,000 natives, with 1400 whites, largely traders and officials. The Orange rises in Mont aux Sources, in the angle made by the volcanic Maluti and Quathlamba Mountains, the scenery of which has led to the country being called the "Switzerland of South Africa." The lowest ground is by the Orange and Caledon rivers, the latter forming the western boundary. Half the area is so high as to be almost uninhabitable, but as the population is increasing (this is now the most densely populated large area in South Africa) agriculture is spreading to higher levels at the expense of grazing, the primitive hoe has been largely displaced by the ox-drawn plough, and soil erosion has become a serious problem. The land is held on a communal basis, and the generally good rainfall (which is distinctly less than that of Swaziland) leads to high veld conditions, except in the mountainous districts.

There are some 435,000 cattle, 90,000 horses, and 2,000,000 sheep and goats. Sheep normally remain throughout the year at the higher elevations, but cattle move from the lower villages in spring to the summer pastures, situated up to 9000 feet. Wheat, grown in the uplands, maize, and Kafir corn are the chief crops. The capital is Maseru (2500 inhabitants, including 600 whites), just east of the Caledon, and reached by a railway across the river from Bloemfontein. Mafeteng lies farther south. The imports and exports in 1938 were respectively valued at £750,000 and £400,000. The chief imports are blankets, cotton goods, agricultural implements, hardware, and groceries. The big exports are wool and wheat, followed by mohair and cattle. Nearly all the trade is *via* the Orange Free State. Large numbers of Basutos leave to work in the Rand mines. There is a movement in the Union which aims at securing control of both Swaziland and Basutoland; the natives are averse from this.

AFRICA

The Trade of the Union of South Africa

The figures in the accompanying table are for the domestic trade. Government imports, largely railway material, are

—	1936	1937	1938
Imports (£1000) .	86,282	103,368	95,860
Exports (£1000) .	110,686	122,500	98,340

included. In addition, there was a re-export trade averaging about £2 $\frac{3}{4}$ million per annum, largely to other parts of British South Africa, as well as a good deal of transit trade.

Many items of both imports and exports, especially the latter, vary very much in both value and quantity from year to year. Thus, the maize surplus in 1938 was relatively small, and in recent years the value of the gold export has been greatly swollen by the gold premium. The following figures relate to 1938. The Union is a considerable market for foodstuffs, and a very big market for manufactured goods. Imports of food products and beverages, notably tea, fish, and grain, totalled £5 $\frac{3}{4}$ million; those of yarns, fibres, textiles, and apparel reached £18,720,000. Machinery (including electrical machinery and apparatus) imports were valued at £17,134,000, miscellaneous metal goods at £13,213,000, motor-cars at £4 million, and motor spirit and oil at £3,850,000. The gold export was valued at nearly £69 million (£82 $\frac{3}{4}$ million in 1937) and diamonds at £2,400,000 (£10 $\frac{3}{4}$ million in 1929, £1,170,000 in 1932). Wool (mostly greasy) reached £9 million (£12 million in 1937), fruit £3,200,000, sugar £2 million, hides and skins £1,400,000, maize £965,000 (£3,200,000 in 1937), wattle bark and extract £910,000, manganese ore £540,000, coal £500,000, (excluding bunkers, valued at over £1 million), with smaller values in descending order of copper, asbestos, blasting compounds, mohair, wines, chrome iron ore, platinum, and tin. The tobacco export was small, and the cotton export negligible. The United Kingdom normally sends some 45 per cent. of

SOUTH AFRICA

the imports, followed by the United States and Germany. Japan has recently been a considerable supplier. The United Kingdom is by far the biggest market, taking some 80 per cent. of the total exports in value, and recently has taken nearly all the gold.

The following figures for 1938 illustrate the relative positions of Cape Town and Durban :

PORT	IMPORTS	EXPORTS
Cape Town .	£20,481,968	Diamonds £2,387,107 Gold . . £47,995,255 Other . . £8,676,821
Durban. .	£33,198,374	Gold and diamonds — Other . . £9,486,091

SHIPPING TONNAGE AND GOODS HANDLED

PORT	ENTERED ¹	TONNAGE LANDED	TONNAGE SHIPPED
Cape Town . .	7,623,824	1,774,169	864,655
Durban . .	7,185,519	2,059,608	3,020,978

THE ISLANDS OF THE SOUTH ATLANTIC

About longitude 15° W. there runs in the South Atlantic Ocean a long ridge, the Dolphin or Mid-Atlantic Ridge, dividing it into an eastern and a western basin. About 8° S. the isolated volcanic peak of Ascension rises from it, and 37° S. is the volcanic Tristan da Cunha group, with Gough Island somewhat farther south. To the east of the ridge, and rising from much deeper water, is St Helena, also volcanic, in latitude 16° S. The fortunes of all these have varied with the changes in ocean transport.

Ascension, discovered in 1501 by the Portuguese, was occupied by Great Britain in 1815, and until 1922, when it was joined to St Helena, was rated as a man of war. It is 34 square miles in area, and is made up of a series of extinct

¹ Including coastwise shipping.

AFRICA

volcanic cones, one—Green Mountain—reaching 2800 feet. In the trade-wind belt, it has tropical temperatures, modified by the ocean; the annual range is small. It is practically rainless below 2000 feet. There is little vegetation except on the upper slopes of Green Mountain, the top of which is often shrouded with mist.¹ Fruit and vegetables are cultivated on this mountain-top. The only settlement, on the north-east coast, is Georgetown. Rabbits, goats, and partridges are numerous, and a little guano, deposited by vast numbers of 'wide-awake' terns, which breed there, is collected. Between January and May sea-turtle breed on the sands, providing food and a small export. The island is rarely visited, as landing is difficult; it has about 160 people, all employed in connexion with the cable-station.

St Helena is a rugged island, with precipitous cliffs, rising to 2700 feet. It was discovered at the same time as Ascension. It was formerly an important victualling-station for ships on the Cape route when ocean transport was by sailing-ship and the Suez route was not available. Its area is 47 square miles, and it has a population of 4000. Though slightly cooler than Ascension, it has a rainfall averaging 35" a year. The island was formerly clothed with redwood and ebony forests, but introduced goats have ruined the vegetation, and rain has washed much soil from the slopes. Domestic animals and many trees and plants have been introduced, and not very successful attempts have recently been made to find a market for early potatoes. The introduction of phormium (New Zealand flax) has been more profitable. Fibre and tow make up almost all the exports, valued at £6781 in 1938 (much declined). There are four flax-mills, and a small lace-making industry. The island is an Admiralty coaling-station; Jamestown, the port and only settlement, is an important cable-station.

Tristan da Cunha. This little group, with a total area of 45 square miles, has no economic importance, but is exceedingly interesting geographically. The highest point on the main island is over 8000 feet in elevation; and only a small plateau in the north-west, about 12 square miles in extent,

¹ Compare with the 'tablecloth' of Table Mountain.

SOUTH AFRICA

is habitable. Snow rests on the highest part during nearly all the year, and, although they are in 37° S. latitude, the islands are swept by stormy westerly winds for more than nine months of the year. Thickets of trees stunted by the strong winds were once plentiful, and there is much grass-land. Corn used to be grown, but rats introduced from a wreck in 1882 have put an end to this crop. A few cattle and sheep are reared. Fish are very plentiful. The chief food is potatoes. The community at present numbers about 130; the inhabitants are the descendants of a few sailors and soldiers who remained here after the British garrison was withdrawn in 1817, and occasional shipwrecked sailors. A few people of other nationalities also settled during the prosperous period associated with the whaling industry about the middle of last century. The islands have no regular communications, and are rarely visited. The people, shy and unsophisticated, lead a hard and lonely life; they are healthy, but, except for the more vigorous younger ones, refuse to leave. The visit of a ship bringing a small mail is an outstanding event.

Far to the south-east is the uninhabited, ice-clad Bouvet Island, in regard to the possession of which there has recently been some discussion with the Norwegian Government in connexion with whaling developments. Britain has waived her claim to this island. The Norwegian Government intends to erect on it a wireless-station. Near to Bouvet Island is believed to be another, Thompson Island, the existence of which is doubted, as it has not been sighted for many years in the vicinity where it is alleged to exist.

CHAPTER XI

CONCLUSION

SOME of the more important problems connected with the development and future of Africa are very different from those associated with other continents which have been colonized or dominated by Europeans. In North America and Australia the Europeans have established themselves with relatively little hindrance from the small indigenous populations; in South America there has been widespread miscegenation, so that over large areas a population of mixed white and native origin forms a very large and important element—so large, in fact, as to be the characteristic feature of the population of a number of South American countries. In Africa, on the other hand, the Europeans for the most part form separate communities with a social and legal position that is quite distinct from that of the natives. In negro Africa, apart from the self-governing units of the British Empire, in which the whites are a minority, there is only one technically independent country—Liberia. Moreover, in a great part of the continent the numbers of Europeans are relatively insignificant and likely to remain so. Indeed, south of the Sahara the total number of whites does not reach $2\frac{1}{2}$ millions, and of this total the Union of South Africa alone has well over 2 millions. In this same area south of the Sahara there are perhaps a hundred million blacks, and, if we ignore relatively small groups of Arabs, Indians, and others, the future of Africa is largely bound up with the status and development of the African. This problem is not, perhaps, essentially geographical, but rather a social and administrative one, but it has important relationships with political and economic geography.

From a more strictly geographical standpoint Africa has problems which, if not different in nature from those of

CONCLUSION

other continents, present some distinctive characteristics. In no other continent is access from the coast to the interior in general so difficult, with the result that transport and communications are still, having regard to the population and resources of Africa, relatively poor. Another set of problems is connected with health and nutrition; over large tracts of Africa disease, often insect-borne, attacks both man and beast, while resistance to disease is frequently lessened by what may in general terms be described as malnutrition. Again, the prevailing simple and even primitive forms of African agriculture are associated with the two major difficulties of locust infestation and soil erosion, which, although by no means confined to Africa, are specially noteworthy.

WHITE ADMINISTRATION

From the point of view of the administrator, as well as from that of the larger interests of the African, the impact of European influence has created problems, the acuteness of which, however, varies to some extent with the political conditions. In black Africa two attitudes are discernible toward the natives; on the one hand the native is regarded as a source of labour in the interests of the whites, and on the other he is encouraged as an independent producer, whether for subsistence or for profit. In general, these trends prevail in varying degrees in the different political divisions, but there is no doubt that the first is a factor that tends to the disintegration of native life and to the breakdown of tribal controls, besides leading to the development of a proletarian native class without any roots in its homeland. The latter is a conserving factor, and may even be the instrument of advancement in economic status and social culture. The significance of this is that the form which African society will assume will in all probability be determined largely by the attitude adopted toward the native by the administrations and by the general relations between white and black; life, occupations, and economic activity will all be affected.

The disturbance to native life is greatest in the Union of

AFRICA

South Africa, where, despite the development of special problems connected with the 'poor white' and 'coloured' classes (see p. 306) and the maintenance of certain native territories or reserves, the policy of conserving the country primarily in the interests of the large white population is deliberately pursued, and it is here that the growth of a landless, labouring native population is most obvious. But disturbance is met with even in inter-tropical Africa, where for the most part permanent white settlement has not taken place, and is not likely to take place. Administrative and economic developments alike contribute to this. Nearly all European administrations have introduced direct taxation of the natives, taxation which has generally to be paid in cash and not in kind. It takes various forms: sometimes it is a poll tax on adult males, sometimes a hut tax, while among pastoral people especially it may be a cattle tax or a dog tax or both. In the mandated territory of South-West Africa it is a grazing tax plus a dog tax. In French West Africa it is a poll tax levied on all individuals over a certain age. Taxation is usually increased up to a stated maximum on men with more than one wife. The prevailing system of taxation has been built up empirically over many years, for even within the same territory there are differing 'capacities to pay,' while there are many difficult problems connected with migratory labour and methods of collection. The rates of taxation vary considerably—from sums equal to a few shillings a year to the equivalent of thirty shillings or more; in Swaziland it is thirty-five shillings. But direct taxation of this kind was something quite new to the African economy, except perhaps in the Moslemized areas of the Sudan, and has in some instances been imposed only with great difficulty. In times of economic depression great hardship has resulted. It is less true now than formerly that the effect of such taxation was to compel men to seek work (obviously usually in European employment), in order to pay the tax, but in some areas it inevitably operates in this way, and has even been defended on the ground that it does so. Most administrations aim at making their territories self-supporting, and this direct taxation generally

CONCLUSION

provides a substantial revenue to this end. It is, however, desirable to notice a tendency to earmark an increasing proportion of the yield of such taxes to social services among the native communities. A striking development of British colonial policy was the guaranteeing by the Government in 1939 of substantial annual sums toward the support and development of such services in the colonial territories.

Direct and Indirect Rule. The integration of territories under the control of European Powers has led to the development of two different attitudes toward the administrative problems involved. The two policies are usually referred to as those of direct rule and indirect rule, and are most typically studied in the French territories in the former case and in some, though by no means all, British colonies and mandated territories in the latter. They reflect probably as much the political outlook of French and British people as they do the considered solution of the problem of administering native peoples. British opinion has for many years been steadily moving in the direction of regarding colonial territories as trusteeships and of considering the desirability of conserving what is good in native social organization, and indirect rule is essentially a method of maintaining and developing the forms of local government, village and tribal, that African culture has built up.

Indirect rule, in effect, takes the local authority—headman, chief, or paramount chief—supports his position and that of his advisers, and, subject to controls exercised through political officers, encourages the maintenance of native law and custom. Duties are given to such authorities—for example, the collection of taxes and the administration of native law and justice. In suitable circumstances the authority becomes the vehicle for the carrying out of other duties, such as social services of health and education and the organization and improvement of agriculture and public works. The aim of indirect rule is clearly to bring the native organization into the general governmental system, not to make it an organ merely to carry out the instructions of the administrative authority. It will be realized that indirect rule is quite unsuited to native peoples

AFRICA

in a primitive stage of development—and Africa provides many examples of such—but the position just outlined is, in fact, functioning in Africa, and represents the peak of the present development of indirect rule in Africa. It is obvious also that the principles of indirect rule cannot be applied to natives who live outside tribal areas in urban and farming districts occupied by Europeans. It is not surprising that the highest development of indirect rule is found in areas in which strong native organizations are well established, notably in Uganda and Nigeria.

Nigeria is usually regarded as the classical example of its development; here the system was built up by Sir Frederick (now Lord) Lugard, whose high position as a colonial administrator is generally recognized. He found the basic material ready to hand in the Mahommedanized emirates and head chieftainships of Northern Nigeria, and in 1914 the system developed there was in large measure extended under the governorship of Sir Donald Cameron to Southern Nigeria, where, on the whole, more varied and looser native organizations prevailed. The Kano Emirate is the most outstanding of these native local governments: with an area of 13,000 square miles and a population of some 2 millions, it has a revenue of about £200,000, and its budget reads rather like that of a considerable British local authority. At a generally lower level of native organization the system of indirect rule has been successfully applied to Tanganyika Territory, and in greater or lesser degree it is being developed in British territories that come under the control of the Colonial Office. It should be remembered that, as in the Gambia and Nyasaland, it has frequently been difficult to find suitable native authorities upon which the system can be based.

It must not be thought that under the system of *direct rule* the native authorities are ignored, but their functions are rather to register or carry out instructions or decrees that come directly from the European authorities. Thus the native authorities are expected to carry out the road improvements or crop-planting extensions which are allotted to them; their powers of discretion are severely limited, and

CONCLUSION

the processes of persuasion and discussion which operate for similar purposes under indirect rule are replaced by more authoritarian methods. Disagreements between the officials and local chiefs are followed usually by the replacement of the latter by selected individuals, not infrequently with disturbing effect upon the members of the village or tribe, a disturbance that is, if possible, avoided under indirect rule. In the Belgian Congo a compromise between the two systems is followed, and direct methods are preferred in some areas under the British flag, notably in the Union of South Africa, Southern Rhodesia, and Kenya Colony; in these, however, there is a progressive development of native councils with some measure of autonomy.

It is, perhaps, too early to assess the relative merits of the two systems. Direct rule, it is argued, is more efficient; things get done more quickly and more thoroughly; in particular, economic development can be rapidly expanded and improvements in health, sanitation, agriculture, and so forth quickly stimulated.¹ It must be remembered that the French colonial administration looks ultimately to the assimilation of the natives with the French system, and the local traditions and outlook are, therefore, not a primary concern of the official mind. Indirect rule is criticized for the strong support given by the administration to the conservative element in African society, with its tendency to stereotype customs and practices that ought, in fact, to be subject to change and development. It is further argued that the obligation imposed upon the weaker native units are such as to overstrain their powers. On the other hand, however, it is pointed out that indirect rule is essentially government by consent, that it provides training in responsibility and prepares the African for a fuller control of his own destiny, and that, if economic and other development is necessarily slow, it is the more surely based. It may well prove that a compromise between the two systems will become the prevailing practice.

¹ Both the French and Belgian administrations favour compulsory cultivation as a means of educating the natives in improved methods and new crops.

AFRICA

NATIVE FARMING

Native agriculture, as has been pointed out, is at a generally low level south of the Sahara. The hoeing-stick is the characteristic agricultural implement, so that the



FIG. 122 BUSOGA WOMEN WITH THEIR HOEING-STICKS. UGANDA
E.N.A.

surface of the ground is only scratched; its fertility is consequently rapidly exhausted, and shifting cultivation prevails over large areas, or the native gardens¹ are remote

¹ The small patches cultivated by the natives are usually referred to as 'gardens'—a suitable term in view of the hand cultivation. They often, however, contain a surprising variety of crops, including some to provide flavouring for the prevailing grain meal.

CONCLUSION

from the villages. The use of manure in the modern sense is generally unknown, though the virtues of ash resulting from the burning off of woodland or grassland are realized, as are those of decayed vegetable matter, while the rotation of crops is often practised. It is a feature of African society that much of the heavy agricultural work is done by the women, though the preparation and maintenance of the gardens, their huts and grain-bins, involve tasks that are shared by the family. That the negro is a practical and adaptable husbandman is shown by the fact that most of the characteristic food crops other than the sorghums and some other cereals were introduced into the continent mainly by the Arabs and Portuguese. But the primary purpose for which the African cultivates is subsistence—though native cultivation for commercial purposes has always been important in some areas—and the advent of the European has brought not only European methods into the areas in which whites have settled, but the desire to develop native cultivation of crops for which there is a world demand. In areas in which the white man has settled the native is a labourer on farms and plantations, although he may gain subsistence as a 'squatter' in return for his labour. Elsewhere he is being encouraged to develop cultivation of cash crops, in some instances with remarkable success, as with West African cocoa or the cotton production of Uganda and the Belgian Congo. Local administrations bring to this work valuable technical assistance, but the improvement of native methods goes on only slowly, while the encouragement of cash crops may lead to the neglect of subsistence crops, as has been noted in connexion with the Gambia.

Man tribes are mainly pastoral, but even among those in which mixed farming prevails great store is set by cattle as a form of wealth. Yet the majority of the native stock are poor animals, ill-cared for, often in a state of semi-starvation and afflicted with disease. There is an enormous field for improvement in this sphere, and here again local administration finds much to do. That progress is being made is shown by the general increase in the numbers of

AFRICA

native-owned stock, though this brings difficulties in its train as tending to overstocking.

In the present stage of African development it would almost appear that European influence has led to too much stress upon commercial crops, so that the production of food in particular areas may be insufficient for the population. The position may be aggravated by insufficient rainfall, by locusts and by other pests, by the draining off of young men for employment in mines and elsewhere, thus breaking the customary routine of cultivation, and by other factors. In some areas, notably parts of Tanganyika Territory, the spread of the infected tsetse fly has necessitated migration, while in many districts soil erosion has become so serious as to lead to the abandonment of formerly useful land. Measures to deal with the locust and the tsetse fly are the subject of active research in Africa, and the eradication and limitation of the tsetse fly form part of the general health services of every inter-tropical territory. While European settlement lies generally outside the range of the tsetse fly, soil erosion affects both native and European alike, and it is a problem that only in comparatively recent times has received serious attention.

SOIL EROSION

Soil erosion is, of course, a world problem, which in some areas—notably the United States, where its prevention was first studied and tackled on an important scale—has attained vast proportions, but in others, such as Western Europe, has relatively minor importance. Where the natural balance of vegetation and animal life is undisturbed the agencies of soil erosion have little to work upon, and the problem may be said not to arise. Man as a farmer, whether agricultural or pastoral, disturbs the natural economy and creates the problem. Many of the relevant facts have been indicated in earlier chapters in this book. In Africa the widespread practice of burning off the natural vegetation cover of forest and grassland begins the process; cultivation or the grazing of more animals than can properly be supported leaves the ground open to the attacks of wind and rain, processes

CONCLUSION

assisted over the greater part of the continent by the prevalence of a dry season when plant growth is hindered. The heavy convectional rain that is characteristic of many parts of Africa is an important aggravating factor in the continent.

Two types of soil erosion are usually distinguished, sheet erosion and gully erosion. The latter form is carried out by



FIG. 123. GULLY EROSION ON FARM LAND, SOUTHERN
TANGANYIKA TERRITORY

Note the parkland type of country with 'umbrella' trees
E.N.A.

running water, and begins by the rainfall finding in cultivated land what may be a hardly discernible run-off channel, which is quickly deepened and widened by the rapid flow of storm water, and becomes the route by which vast quantities of surface soil from the adjacent areas are taken away, leaving hard and untillable earth. The initial gully cuts back and develops tributary gullies, adding to the destructive process. Earth roads and tracks followed by stock are fruitful causes of this type of erosion, which has been disastrous in Basutoland (where it has largely contri-

AFRICA

buted to the heavy migration of natives to work in mines elsewhere) and in parts of the Union of South Africa.

Sheet erosion is the removal of top soil from considerable tracts in almost uniform degree, and may be the work of rains or of wind. It is to be seen specially on hill slopes and undulating surfaces, and has been particularly noted in Kenya Colony and Nyasaland, while on land of less bold relief it has been studied in Uganda and Tanganyika Territory. Winds, especially drying winds, remove soil from cultivated land, but this form of erosion is perhaps most widespread in grazing areas in open, treeless districts where the grass cover is cropped close to the ground. In many areas—for example, in Kenya and Basutoland—the damage is largely attributed to goats, whose habit is to destroy all vegetation they can reach. The encroachment southward of the Sahara referred to in an earlier chapter may in part be attributed to wind erosion. Sheet erosion is, unfortunately, insidious: it takes place relatively slowly, and much damage may be done before it is noticed. Both sheet and gully erosion are serious in the Union of South Africa, where a national calamity has been predicted if the danger be not checked.

Some of the results of soil erosion are obvious; others are less so. The removal of top soil which contains humus and plant nutriment can be easily realized; what remains is hard and infertile. But other results are also important. Thus the rapidity of the run-off of water is much increased, so that the amount percolating into the ground is reduced, and the replenishment of wells and springs does not take place. Some of Kenya's small perennial streams are now intermittent. Rivers have their *régimes* exaggerated as a result of soil erosion. The effective rainfall, that which is not lost by run-off and by evaporation, is seriously reduced. Again, most of the soil removed finds its way to the sea, but some silts up reservoirs and other water storages (see p. 318), thus creating another serious problem.

Soil erosion cannot be entirely prevented, but it can be controlled. Terracing is an obvious preventive, but it is little practised in Africa; the practice of contour banking associated with contour ploughing is, however, being in-

CONCLUSION

creasingly adopted on European farms, and is not unknown among native farmers. Strip-cropping, in which a belt of soil-binding vegetation such as clover is planted at intervals along the contours of a slope devoted to a main crop, is another device; while gully erosion can be hindered by the planting of root-binding vegetation on the banks and by the provision of dams. The most important measure, however, that of reafforestation of large tracts of the catchment areas of rivers, especially round the headwaters, where gradients are steepest, presents special difficulties. The scale on which it would need to be done would be enormous and the cost prohibitive. The resources of most territories permit little more than the conservation of the existing forest and woodland cover.

The problem in pastoral areas is different. Uncontrolled burning off is thoroughly bad, for the vitality of the native grasses is weakened and organic matter in the soil is destroyed. It may be noted that burning off is largely practised on European farms on the veld. The occurrence of few surface streams and wells leads to dangerous concentration of grazing on relatively small areas, while grass is ruined in the kraals and their approaches by the concentration of stock; this initiates sheet erosion. More wells and paddocking, instead of kraaling, are therefore desirable reforms. But, unfortunately, the social significance of cattle is so great among Africans that much well-nigh useless stock is kept, far more than is required for food or for sale. To reduce their numbers by eliminating poor specimens and giving more care and scientific treatment to the remainder would bring the problem of overstocking to manageable proportions; but this desirable end is not likely to be realized without a fundamental change in the attitude of the natives to their domestic animals.

SOME EFFECTS OF EUROPEAN ACTIVITIES

The factor which is most disturbing to native life is the demand for labour in European enterprises. These may be public works, roads, railways, and the like, undertaken by

AFRICA

the administration; they may be European farms or plantations; but most significant of all are the mines. Forced labour, the exaction of a certain number of days' work per annum from adult males, is generally demanded in African territories for public works, and is usually organized through the chiefs. A convention of 1930 regulates it for most territories (not all the interested Powers have ratified the convention), and this convention prohibits it for private purposes. It is, perhaps, worth recording that Portuguese administrations have been criticized for permitting forced labour for such purposes. But forced labour usually produces relatively little disturbance, for the work is often not very distant from the native villages. Working on European farms is more unsettling, especially in the Union of South Africa, where many almost detribalized squatters are found on the farms.

The construction of railways and public works such as irrigation schemes, and above all mining enterprises, are, however, associated with large-scale migration often to great distances, and raise problems that, fortunately, are receiving increasing attention. Recent figures for the Rand mines, where over 300,000 natives are employed, show some 50,000 from Basutoland and 90,000 from Mozambique; the average proportion of adult males absent from Basutoland is 50 per cent. Nyasaland is another territory depleted at any one time of a very large proportion of its adult males, mainly for work in Southern Rhodesia. Mining development on the Gold Coast and in the Belgian Congo, Northern Rhodesia, and elsewhere has in recent years brought about the recruitment of many tens of thousands of natives.

The social consequences, as affecting the village, the tribe, and the normal course of life, are clearly profound. Many migrants do not return, and native life tends to become disorganized. The native labour is cheap and usually regarded as inefficient, so that large numbers of such workers are needed. In Southern Africa particularly the colour bar operates and limits the opportunities of the African. Organization at the mines needs to be very careful. The provision of housing, of health services—especially anti-

CONCLUSION

malarial measures in tropical Africa—of welfare services, and of food supplies is the normal accompaniment of larger

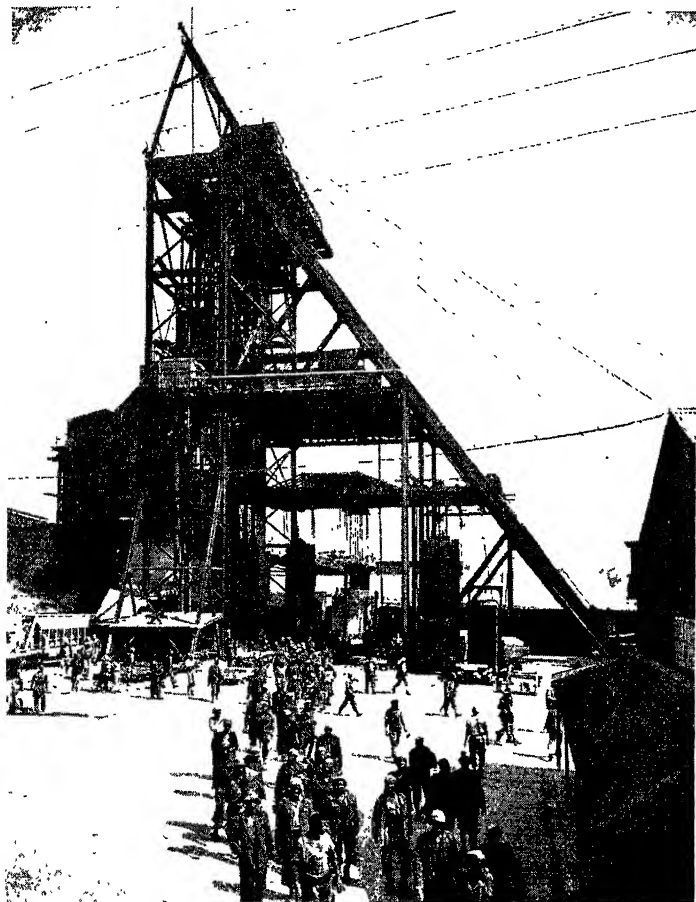


FIG. 124. NATIVES LEAVING A GOLD-MINE IN THE RAND
South African Railways and Harbours

mining enterprises to-day. Labourers are recruited usually on short-term contracts, and in many territories the administration imposes safeguards. Severe punishments of the

AFRICA

recruited labourers, especially for breach of contract, are features of the laws in many territories.

OTHER PROBLEMS

It is possible only to mention some of the remaining matters of importance. The alienation of land for white settlement, for mining, and for other purposes has in places created difficult problems, since the private ownership of land is alien to the African's traditions. In some areas the promising development of co-operative societies among the natives, largely copied from India and Ceylon, is a feature with encouraging repercussions on the quality of the native production and the stability of native commercial cultivation. Though best developed on the Gold Coast, the movement has begun in Nigeria, Kenya, and Tanganyika, and similar organizations are established in some French territories. Progress in Africa will be largely conditioned by the health of the native, and, apart from problems connected with disease, there is the question of nutrition: pastoral and agricultural tribes alike usually show ill-balanced diets that affect both the general health and resistance to disease. Above all, there is the problem of native education, too often sporadic and parsimonious. The type of education, the use of the vernacular, the quality of the teaching staffs, higher education—these are all matters in which there is no uniformity and rarely a settled policy. The relationship of education to the development of an African culture has received little attention: in the French territories it is generally ignored.

Having regard to its great size and large total population, the contribution of Africa to the world's trade is relatively small, because if mining products and European farming are excepted, there is comparatively little commercial production, the vast majority of the inhabitants being concerned primarily with subsistence farming. Their standard of living is such that they provide only a small market. With certain important exceptions, including Egyptian cotton and much

AFRICA

purposes the provision of roads to feed railways which connect up with ports is the form that development has taken. There will always remain, however, large tracts of arid or forested land where communications will be scanty, and which will remain as barriers between one important section of the continent and another. The Sahara is such a barrier, and especially divides North Africa, with its age-long contacts with the civilized world and with its distinctive peoples, from negro Africa, where the destiny of the black race will be worked out.

STATISTICAL APPENDIX

Notes. Trade figures marked (a) are for 1938, those marked (b) for 1937. The figures normally exclude the value of imports of bullion and specie and of re-export and transit trade.

As the trade figures reflect the position in the years immediately preceding the outbreak of the war which began in 1939, the student is advised to compare them with figures for other years obtainable from *The Statesman's Year-book*.

POLITICAL DIVISION	AREA IN SQUARE MILES	POPULATION	IMPORTS IN THOUSANDS OF £	EXPORTS IN THOUSANDS OF £	CAPITAL OR ADMINISTRATIVE CENTRE
(A) INDEPENDENT STATES					
EGYPT	383,000	15,904,000	36,027 (a) 500 (b)	28,587 (a) 500 (b)	Cairo
LIBERIA	43,000	1,000,000			Monrovia
(B) BRITISH AREAS					
(a) Self-governing					
UNION OF SOUTH AFRICA	472,120	2,116,500 ¹	95,850 (a)	98,340 (a)	Pretoria
Cape of Good Hope .	276,739	818,700 ¹	—	—	Cape Town
Natal	35,284	199,200 ¹	—	—	Pietermaritzburg
Transvaal	110,450	897,000 ¹	—	—	Pretoria
Orange Free State .	49,647	201,000 ¹	—	—	Bloemfontein
SOUTHERN RHODESIA .	150,000	1,210,000	9,750 (a)	11,880 (a)	Salisbury
(b) Other Areas					
THE GAMBIA	4,100	200,000	801 (b)	710 (b)	Bathurst

¹ Whites only. The total population of the Union in 1939 was about 10,157,000 (see p. 305).

POLITICAL DIVISION	AREA IN SQUARE MILES	POPULATION	IMPORTS IN THOUSANDS OF £	EXPORTS IN THOUSANDS OF £	CAPITAL OR ADMINISTRATIVE CENTRE
SIERRA LEONE . . .	28,000	1,800,000	1,500 (a)	2,389 (a)	Freetown
GOLD COAST ¹ . . .	78,800	3,260,000	19,380 (a)	15,425 (a)	Accra
NIGERIA ¹ . . .	339,000	21,000,000	11,567 (a)	14,390 (a)	Lagos
ANGLO-EGYPTIAN SUDAN	990,000	6,350,000	6,283 (a)	5,490 (a)	Khartum
BRITISH SOMALILAND	68,000	344,000	680 (a)	286 (a)	Berbera
UGANDA . . .	94,000	3,750,000	8,005 (a)	8,505 (a)	Entebbe
KENYA . . .	225,000	3,254,000	994 (a)	845 (a)	Nairobi
ZANZIBAR AND PEMBA	1,020	243,000	5,114 (a)	10,130 (a)	Zanzibar Town
NORTHERN RHODESIA	288,000	1,400,000	833 (a)	975 (a)	Lusaka
NYASALAND . . .	38,000	1,700,000	2,550 (a)	2,500 (a)	Zomba
MAURITIUS . . .	720	415,000	80 (a)	70 (a)	Curepipe
SEYCHELLES . . .	156	31,500	—	—	Port Victoria
BECHUANALAND PROTECTORATE	275,000	266,000	361 (a)	376 (a)	Mafeking
TORATE . . .	11,716	562,000	750 (a)	400 (a)	Maseru
BASUTOLAND . . .	6,705	157,000	—	100 (a)	M'babane
SWAZILAND . . .	—	—	—	—	—
ASCENSION . . .	34	160	—	—	Jamestown
St Helena . . .	47	4,000	37 (a)	7 (a)	Aden
SOCOTRA . . .	1,300	12,000	—	—	—
(c) Mandated Territories					
TOGOLAND . . .	13,000	340,000	263 ³	—	Accra
CAMEROONS . . .	34,200	820,000	3,450 (a)	445 ²	Lagos
TANGANYIKA TERRITORY	360,000	5,190,000	2,430 (a)	3,707 (a)	Dar es Salaam
SOUTH-WEST AFRICA .	318,000	290,000	—	3,540 (a)	Windhoek

¹ Trade figures include those of adjacent mandated territories. ² Figures for 1936.

POLITICAL DIVISION	AREA IN SQUARE MILES	POPULATION	IMPORTS IN THOUSANDS OF £	EXPORTS IN THOUSANDS OF £	CAPITAL OR ADMINISTRATIVE CENTRE
(C) FRENCH AREAS					
ALGERIA	847,000	7,250,000	32,700 (b)	34,700 (b)	Algiers
MOROCCO	160,000	6,300,000	12,300 (a)	8,700 (a)	Rabat
TUNISIA	50,000	2,600,000	10,600 (b)	9,120 (b)	Tunis
MAURITANIA	347,000	386,000	11 (b)	13 (b)	Port Étienne
SENEGAL	77,000	1,700,000	8,590 (b)	6,685 (b)	St Louis
SUDAN	580,000	3,570,000			Bamako
GUINEA	97,000	2,011,000	1,191 (b)	1,358 (b)	Konakri
IVORY COAST	180,000	3,900,000	2,291 (b)	2,539 (b)	Abidjan
DAHOMY	43,000	1,351,000	363 (b)	956 (b)	Porto Novo
NIGER	490,000	1,760,000	286 (b)	261 (b)	Niamey
GABON	93,000	410,000	441 ¹	1,008 ¹	Libreville
MIDDLE CONGO	166,000	747,000	1,158 ¹	223 ¹	Brazzaville
UBANGI-SHARI	259,000	834,000	252 ¹	376 ¹	Banghi
CHAD	461,000	1,400,000	130 ¹	189 ¹	Fort Lamy
MADAGASCAR, etc.	241,000	3,800,000	3,550 (a)	4,825 (a)	Antananarivo
REUNION	970	210,000	1,500 (a)	1,200 (a)	St Denis
FRENCH SOMALILAND	8,500	45,000	1,500 (a)	1,500 (a)	Jibuti
TOGOLAND (<i>mandate</i>)	21,900	737,000	630 (b)	630 (b)	Lome
CAMEROONS (<i>mandate</i>)	166,500	2,500,000	1,230 (a)	1,439 (a)	Yaunde
(D) ITALIAN AREAS					
LIBYA	685,000	850,000	6,600 (b)	1,330 (b)	Tripoli

¹ Figures for 1936.

POLITICAL DIVISION	AREA IN SQUARE MILES	POPULATION	IMPORTS IN THOUSANDS OF £	EXPORTS IN THOUSANDS OF £	CAPITAL OR ADMINISTRATIVE CENTRE
FORMER ITALIAN EAST AFRICA (INCLUDING ABYSSINIA)	650,000	7,600,000	6,000 (est.)	3,000 (est.)	Addis Ababa
(E) PORTUGUESE AREAS					
ANGOLA	484,000	3,444,000	1,954 (b)	3,125 (b)	Loanda.
MOZAMBIQUE	298,000	5,000,000	2,982 (b)	1,981 (b)	Lourenço Marques
GUINEA	14,000	415,000	267 (a)	291 (a)	Bolama
AZORES	922	253,000	—	—	Ponta Delgada
MADEIRAS	314	210,000	—	—	Funchal
CAPE VERDE ISLANDS	1,500	162,000	973 (a)	1,070 (a)	Praia
SÃO THOMÉ and PRINCEPE	384	59,000	181 (b)	422 (b)	São Thomé
(F) SPANISH AREAS					
CANARY ISLANDS	2,800	609,000	3,000 (est.)	3,000 (est.)	Las Palmas and Santa Cruz
MOROCCO	13,000	795,000	900 (b)	225 (b)	Tetuan
IFNI	965	20,000	—	—	Ifni
RIO DE ORO	109,000	20,000	—	—	Villa Cisneros
FERNANDO Po, etc.	795	24,000	—	—	Santa Isabel
RIO MUNI	9,470	90,000	—	—	Santa Isabel
(G) OTHER AREAS					
BELGIAN CONGO	918,000	10,250,000	4,804 (b)	16,580 (b)	Leopoldville
TANGIER ZONE	225	60,000	650 (b)	66 (b)	Tangier

INDEX

- ABAYA, LAKE, 25, 51
Abercorn, 292, 293, 294
Aberdare Mountains, 232
Abeshr, 105
Abidjan, 201, 202
Abyssinia (Italian East Africa), 25,
56, 60, 61, 65, 117, 119, 152, 153-
157, 162; productions, 156-157;
towns and communications, 157
Abyssinian Highlands, 24, 25, 39, 46,
49, 117, 123, 150, 153
Acacia, 47, 123, 184, 187, 301, 315,
316
Accra, 20, 165, 182, 185, 186
Adamawa Highlands, 49, 208
Addi Ugri, 158
Addis Ababa, 65, 118, 151, 152, 153,
154, 156, 157, 160
Administration, 359-363
Adrar, 73, 102, 103
Aerial survey, 276
Afram, river, 181
Africa, British West, etc.—*see* Brit-
ish West Africa, etc.
Afrikaans, 302, 307
Agades, 100, 104
Agadez, 100, 104
Agadez, 364-366
Agadez, 367
Agulhas, Cape, 19, 34, 36
Agulhas Current, 273
Ahaggar, 22, 73, 76, 89, 99, 100, 101,
103, 104
Ain Sefra, 94
Air, 73, 99, 100, 101, 104
Air routes, 70-70a, 83, 88, 95, 98,
108, 109, 135, 148, 196, 224, 234,
238, 244, 335-336
Akan negroes, 181
Akassa, 169, 170
Alaotra, Lake, 253, 260
Albert, Lake, 25, 116, 129, 148, 221,
229, 230, 237
Albert Nile, river, 116
Albertville, 222
Alcazar (El Kasr), 83, 84
Aladabra Island, 267
Aleppo pine, 91
Alexandria, 70, 120, 134, 135, 136
Alfa, 77, 97, 107. *See also* Esparto
Algeria, 26, 89-95; physical features,
90-91; people, 91; resources, 91-
92; minerals, 92-93; towns and
railways, 93-95; trade, 95
Algeria, Southern, 89, 103-104
Algiers, 74, 76, 89, 92, 94, 95
Algoa Bay, 277, 349
Aliwal North, 350
Alluvial diamonds, 222, 227, 304,
306, 330, 331, 350, 351
Alsatian colonists in Algeria, 81
Amhara, 154, 155
Amirantes Island, 267
Ampasindova, 254
Andreba, 259
Anglo-Egyptian Sudan, 64, 65, 140-
149; vegetation and products,
142-146; cotton, 143-146; towns
and communications, 147-149;
trade, 149. *See also* Egypt and
the Anglo-Egyptian Sudan (eco-
nomic region)
Ango-Ango, 224
Angola, 56, 57, 206, 208, 211, 226-
228; products, 226-227; towns
and railways, 227-228; trade, 228
Angora goat, 324
Animal life, 50-52. *See also* under
the different economic regions
Ankaratra, 253
Ankobra, river, 181, 184
Ankole, 237
Ankor, 163
Ankore, 206
Ankore, 253, 254, 255, 257,
260
Anthropoids, 256
Anti-Atlas, 26, 72
Anti-trade wind, 112
Antsirabe, 260
Apapa, 193
Api, 217

AFRICA

- Arab influence, 53, 55, 60, 68
 Arabs, 54, 57, 85, 95, 101, 124, 131, 142, 164, 233, 249, 252, 262, 279
 Arsenic, 219, 298
 Artesian water, 80, 324
 Arusha, 245, 248
 Asbestos, 284, 285, 298, 300, 332-333
 Ascension, 355-356
 Ashanti, 181, 184, 186
 Ashmouni cotton, 133
 Asmara, 157, 158
 Assab, 157, 158
 Assinie, 202
 Aswan, 118, 126, 128, 136
 Asvut, 126
 Atbara, river, 117, 118, 121, 151
 Atbara, town, 144, 148
 Atlantic, islands of the South, 355-356; Ascension, 355-356; St Helena, 356; Tristan da Cunha, 356-357; Bouvet Island, 357
 Atlas Mountains, 20, 26, 27, 33, 37, 41, 71, 72, 73, 85, 90, 91, 96
 Aughrabies Falls, 310, 350
 Aures massif, 72, 78, 91
 Axim, 186
 Azores Islands, 110-111
- BAB EL MANDEB, 150
 'Backvelders,' 306
 Baganda, 124, 238
 Bahr el Arab, 116
 Bahr el Ghazal, 23, 33, 116, 117, 120, 123, 148
 Bahr el Jebel, 31, 116, 120
 Bahr Yusuf, 133
 Bamako, 167, 198, 199, 200
 Bamboo, 177, 209, 236, 241, 255
 Banana, fruit, 46, 107, 160, 180, 214, 237, 240, 283, 323, 344
 Banana, town, 210, 224
 Bandama, river, 201
 Banghi, 214-215
 Bangweolo, Lake, 33, 208, 273, 291
 Bani, river, 198, 200
 'Banken,' 337
 'Banket,' 24, 309, 329
 Bantu, 54, 124, 211, 234, 277, 278, 287, 306
 Baobab-tree, 47, 49, 123, 301, 316
 Baraka, river, 140, 145, 151, 157
 Barbary, 58, 93
 Barberton, 323, 329, 338
- Barka, 76, 107, 108
 Barley, 80, 86, 91, 97, 107, 109, 125, 156, 163, 320-321
 Barotse, 277
 Barotseland, 289, 292
 Barrakunda Rapids, 167
 Barseem, 132
 Bassam, 202
 Basse, 177
 Basutoland, 281, 307, 340, 353
 Bata, 216
 Bathurst, 177
 Batna, 93
 Batna Mountains, 91
 Bauchi, 166, 169, 171, 188, 192
 Bauxite, 185, 258, 288
 Beans, 86, 92, 257, 288, 297, 321
 Beaufort West, 348
 Bechuanaland, 281, 294, 300-301, 346
 Bechuanas, 277
 Bedouin, 124, 131
 Beeswax, 158, 180, 200, 226, 247, 249, 257, 288
 Beira, 223, 224, 269, 281, 282, 283, 284, 285, 289, 299; hinterland of, 284, 286; transit trade of, 285
 Beitbridge, 299
 Belgian Congo, 174, 216-225; crops and livestock, 218-220; minerals, 220-221; transport, 222-224; towns, 224-225; trade, 225
 Ben Guérir, 88
 Benghazi, 106, 107, 108
 Benguella, 21, 228
 Benguella Current, 35, 38, 45, 210, 273, 303, 327
 Beni Abbes, 100
 Beni Saf, 92, 93
 Benin, Bight of, 166
 Benin, river, 188
 Benito, 216
 Benue, river, 29, 31, 167, 188, 209, 215
 Ber Reched, 87
 Berber, 118, 148
 Berbera, 152, 163-164
 Berbers, 53, 54, 78, 90, 91, 95, 101, 106, 112
 Berg winds, 314
 Bethal, 338
 Bethlehem, 341
 Betsiboka, river, 253

INDEX

- Betsileo, 252, 260
 Biatra, 35, 166
 Bihe plateau, 23, 208, 209, 210, 211, 226, 228, 271
 Bingerville, 201
 Biskra, 75, 76, 91, 94
 Bismarck, Prince, 278
 Bissagos Archipelago, 204
 Bissau, 204
 Bitter Lakes, 138
 Bizerta, 72, 98
 Black ironwood, 315
 'Black vlel soil,' 295
 Blanco, Cape (Mauritania), 103, 113
 Blanco, Cape (Tunisia), 19, 34
 Blantyre, 288, 289
 Blida, 77, 94
 Bloemfontein, 274, 281, 320, 340, 341
 Bloemfontein River Settlements, 336, 341
 Bloemhof, 339
 'Blue ground,' 330
 Blue Nile, river, 117, 120, 121, 126, 151
 Bobo Diulasso, 195, 202
 Bodele, 100, 101, 104
 Boers, 277, 278, 317
 Boia, 180, 181
 Bolama, 204
 Boll-worm, 133, 146
 Boma, 224
 Bombetoki, 254
 Bon, Cape, 26, 96, 97, 98
 Bône, town, 90, 93
 Bonito, 87
 Bonny, 193
 Bonthe, 178, 180
 Bornu, 188, 189
 Botletle, river, 273, 300
 Bougie, 91, 93
 Bourbon, 262
 Bouvet Island, 357
 Brakpan, 338
 Brazzaville, 214, 224
 Breede, river, 309, 348
 Brickaville, 259
 British South Africa Chartered Company, 278, 289
 British West Africa, 176-194
 Brits, 321, 339
 Broken Hill, 292, 293
 Bu Regreg, Wadi, 85
 Buffalo, animal, 217
 Buffalo, river, 350
 Bukama, 221, 222
 Bukoba, people, 235
 Bukoba, town, 246, 248
 Bukuru, 166, 192
 Bulawayo, 224, 274, 281, 298, 299, 335
 Bush veld, 275, 315, 324, 337
 Bushmanland, 346, 351
 Bushmen, 54, 277, 302
 Busoga Railway, 237, 244
 Bussa, 28
 Butterworth, 351
 Bwake, 202
 Bwana Mkubwa, 292
 CACTUS, 315
 Cairo, 118, 120, 122, 125, 126, 134-135, 136
 Calabar, 193
 Caldera, 113
 Caledon, river, 272, 340, 341, 353
 Caledon, town, 348
 Calvinia, 351
 Camel, 81, 108, 159, 163
 Cameron, Sir Donald, 362
 Cameroon Peak, 22, 39, 188, 194
 Cameroons, 67, 168, 187, 188, 193, 194, 208, 211, 213, 215
 Camphor forest, 241
 Canaries Current, 35, 38, 74, 75, 169
 Canary Islands, 70, 110, 112-114
 "Cape to Cairo" Railway, 69, 335
 Cape Coast Castle, 165, 170
 Cape of Good Hope (Cape Province), 69, 305, 323, 324, 325, 332, 346-351
 Cape horse, 326
 Cape Palmas, 205
 Cape scrub, 315, 316
 Cape Town, 69, 70, 213, 274, 307, 313, 314, 335, 336, 337, 344, 346, 355
 Cape Verde Islands, 70, 204
 'Carbonado,' 331*n*.
 Carnarvon, 351
 Carnivores, 50, 242, 256
 Carolina, 332, 338
 Carro, 112
 Carthage, 53, 54, 74, 78, 79, 98
 Casablanca, 70, 81, 82, 83, 86, 87
 Cassandra, river, 201
 Cassava, 46, 172, 175, 177, 180, 237, 240, 288. *See also* Manioc

AFRICA

- Castor oil, 175, 226, 258, 283
 Cathkin Peak, 271
 Cattle, 48, 80, 86, 92, 108, 123, 146, 189, 191, 219, 225, 226, 242, 246, 258, 262, 280, 288, 296, 297, 304, 305, 323, 352, 353
 Caucasians, 53
 Cazengo, 227
 Cedar, 77, 232, 241
 Central Africa (economic region), 67, 207-228, physical features, 207-210; climate and vegetation, 210-211, development, 211-213; political divisions, 213-228
 Ceres, 348
 Ceuta, 83, 84
 Chad, Lake, 22, 29, 32, 33, 60, 66, 105, 140, 165, 166, 188, 189, 191, 209, 214, 215
 Chad Colony, 73, 104-105, 213, 214, 215
 Chagos Archipelago, 267
 Chaka, 343, 344
 Chameleon, 256
 Chela, 224
 Chelif, Wadi, 72, 74, 90, 94
 Chemana, 102
 Cheren, 158
 Chillies, 180, 288
 Chilwa, Lake, 287
 Chinde, 32, 284
 Chinese, 252, 263, 264, 279, 306
 Chinkolobwe, 221
 Chipoka, 289n.
 Chiromo, 286
 Chobe, river, 29
 Chobe Swamp, 300
 Cholo, 288
 Christianborg Castle, 165
 Chrome ore, 285, 295, 298, 300, 339
 Cinchona, 206
 Cinnamon, 268
 Citrus fruits, 86, 92, 97, 180, 184, 297, 319, 323
 Clanwilliam, 348
 Climate of Africa, 33-45
 Cloves, 250, 251, 257, 264, 268
 Coal, 69, 191, 193, 221, 251, 279, 284, 295, 298, 300; in Union of South Africa, 331
 Cobalt, 292, 293
Coco-de-mer, 268
 Cocoa, 46, 69, 174, 180, 182, 183, 184, 187, 190, 201, 202, 206, 219, 225, 237, 258, 262
 Coconut, 180, 240, 248, 249, 250, 258, 262, 266, 268
 Coffee, 68, 155, 161, 180, 205, 219, 226-227, 237, 241, 246, 257, 263, 283, 288, 322
 Colenso, 344
 Colomb Béchar, 93, 106
 Colour bar, 305
 Communications of Africa, 62-63, 373. *See also under the different economic and political divisions*
 Communications, overseas, 69-70
 Comoro Islands, 261-262
 Congo basin, 21, 22, 23, 38, 46, 60, 207, 210, 211
 Congo, Belgian—*see* Belgian Congo
 Congo Free State, 216
 Congo River, 23, 27, 29, 30, 32, 33, 67, 208, 215, 226, 291
 Constantine, 75, 76, 93
 Continental shelf, 20
 Convectional rain, 45, 254
 Copal, 170, 180, 184, 189, 211, 220, 246, 255, 257
 Copper, 24, 220, 221, 225, 227, 248, 285, 292, 293, 298, 304, 332, 350
 Copra, 184, 251, 258, 267, 283
 Coptic Church, 154
 Coral, 140, 259, 264, 267
 Corisco, 215
 Cormorant, 327
 Costermansville, 222
 Cotonou, 202
 Cotton, 48, 65, 69, 86, 92, 129, 159, 163, 174, 175, 180, 184, 189, 190, 196, 197, 199, 200, 201, 202, 218, 225, 227, 236, 244, 246, 251, 257, 258, 280, 283, 288, 290, 292, 297, 310, 322; in Egypt, 132 *et seq.*; in Anglo-Egyptian Sudan, 143 *et seq.*
 Cowrie shells, 175
 Creoles, 252, 264, 267
Créoles bourbonnais, 263
Cri. de l'air, 77, 89
 Cross River, 309, 339
 Cross River, 188, 189, 193
 Crystal Mountains, 208, 223
 Cubango Marshes, 273, 300
 Cubango, river, 300
 Curepipe, 266
 Curieuse, 268

INDEX

Currents, ocean, 34-36
 Cutch, 283
 Cyclones (depressions), 38, 40, 255
 Cyrenaica, 106, 107-109

 DAHABEEYAH, 136
 Dahlak Archipelago, 158
 Dahomey, 194, 202-203
 Dairying, 297, 319, 323
 Dakar, 66, 70, 175, 194, 195, 196, 198
 Dakar-Casablanca air route, 111
 Dakhla, 133, 136
 Damaraland, 23
 Damietta, 118, 122, 136
 Danakils, 156
 Danes, 165
 Dar Fertit, 208
 Dar Fur, 22, 73, 140, 149
 Dar es Salaam, 224, 248, 293
 Dates, 50, 78, 86, 88, 92, 97, 108, 109,
 132, 142, 246
 De Aar, 335, 348, 350
 De Beers Company, 330
 Debo, Lake, 22, 33
 Dega, 156
 Delagoa Bay, 273, 278, 284, 285, 351
 Delta Range, 126
 Derna, 106, 107, 109
 Desertas, 111
 Desiccation of Africa, 29, 136, 189,
 300
 Development of Africa, 61-63
 Dhow, 161, 250
 Diamond Corporation, 331n.
 Diamonds, 69, 181, 184, 221, 227,
 247, 278, 304, 305, 317, 327; in
 Union of South Africa, 329-331.
 See also Alluvial diamonds
 Diaz, Bartolommeo, 305
 Diego Garcia, 267
 Diego Suarez, 254, 258, 261
 Dikwa, 169, 192
 "Dilolo Boot," 228
 Dingaan, 343
 Dipping-tank, 51, 280, 284
 Dire Dawa, 157
 Dodoma, 248
 Dolerite, 308
 Dolphin Ridge, 355
 Dom-palm, 104, 146, 158, 198
 Domira Bay, 289, 293
 Dongola, 148
 Donkeys, 61, 189, 193, 296, 325, 326

Draa, Wadi, 27, 85
 Drift of Africa, 27-32
 Drought, 23, 48, 271, 272,
 307, 315, 337, 340, 343
 Duala, 215
 Dufie, 116
 Dundee, 331, 344
 Dura, 143, 159, 321. *See also* Millet
 Durban, 69, 70, 273, 274, 277, 332,
 335, 336, 339, 343, 344, 355
 Dutch, the, 56, 165, 245, 307, 317

 EAST AFRICA (economic region), 67,
 229-251; physical features, 229-
 230; climate and natural regions,
 230-233; development, 160-161,
 233-235; political divisions, 235-
 251
 East Africa Commission, 235
 East Africa Company, 233
 East-coast fever, 51, 296
 East London, 309, 334, 350
 Eastern Horn (economic region), 65,
 150-163; physical features, 150-
 151; climate and vegetation, 151-
 152; development, 152-153; poli-
 tical divisions, 153-163
 Ebony, 246, 255, 257
 Economic regions of Africa, 63-69
 Edea, 215
 Edfu, 126
 Edward, Lake, 116, 207, 230
 Eggs, 84, 89, 132
 Egypt, 31, 61, 64, 115, 121, 124,
 130-140; agriculture, 131-133;
 cotton, 133-134; minerals, 134;
 industries and towns, 134-136;
 communications, 136-137; the
 Suez Canal, 137-139; trade of
 Egypt, 139-140. *See also* Egypt
 and the Anglo-Egyptian Sudan
 (economic region)
 Egypt and the Anglo-Egyptian
 Sudan (economic region), 64-65,
 115-130; physical conditions,
 116-120; régime of the Nile, 120-
 122; vegetation, 122-124; peo-
 ple, 124; irrigation and agricul-
 ture, 125-130; towns and com-
 munications, 147-149
 Egypt, Lower, 118, 130
 Egypt, Upper, 118, 130, 132-133
 El Arish, 83

AFRICA

- El Bourudj, 87
 El Djem, 98
 El Fasher, 119, 142, 149
 El Kantara (Algeria), 91
 El Kantara (Egypt), 137
 El Kasr, 83
 El Nahud, 143
 El Obeid, 118, 143, 148
 Eldoret, 244
 Elephant, 123, 217, 218, 283
 Elgon, Mount, 25, 229, 235
 Elizabethville, 216, 220, 221, 224
 Emigrants, 307
 Entebbe, 119, 238
 Enugu, 191
 Equatoria Province, 142
 Equatorial Current, 35
Erg, 99, 103, 107
 Eritrea, 153, 154, 157-158
 Ermelo, 320, 332, 338
 Esparto, 77. *See also* Alfa
 Abyssinia
 , 28, 33, 302, 303
 Eucalyptus, 77, 288, 315
 European influence in Africa, 56-58
- FALASHAS, 155
 Falémé, river, 199
 False Bay, 36, 348
 Fanti, 181
 Farquhar Island, 267
 Fayal, 111
 Fayum, 118, 130, 133
 Fedhala, 87
 Fellahin, 124, 130, 132
 Fernando Po, 22, 194, 205, 206, 216
 Fez, 83, 87
 Fezzan, 107
 Fianarantsoa, 257, 260
 Ficksburg, 341
 Fife, 293
 Figig, 88
 Fishing, 85, 92, 97, 103, 107, 109,
 113, 175, 184, 218, 267, 268, 280,
 284, 304, 326
 Flax, 92, 133, 241
 Flores, island, 110
 Fog, 35, 274
 Fogo, 204
Fonduks, 108
 Forcados, 193
 Forest-clearing, 171, 182, 189, 257
 Fort Dauphin, 253
- Fort Jameson, 292, 293
 Fort Lamy, 214, 215
 Fortunate Islands, 112
 Fourteen Streams, 318, 335, 349
 Francistown, 301
 Frankfort, 341
 Frankincense, 163
 Freetown, 70, 168, 169, 170, 180
 French Equatorial Africa, 165, 213-
 215
 French Guinea, 194, 200-201
 French Sudan—*see* Sudan, French
 French West Africa, 194-203, trade,
 196; political divisions, 196-203
 Frio, Cape, 28, 35
 Frost, 41, 232, 275, 310
 Fruit, 80, 85, 86, 92, 97, 113, 132,
 241, 250, 297, 323, 348. *See also*
 Citrus fruits
 Fuerteventura, 112
 Fula, 171, 176, 178, 188
 Fula Empire, 55, 171
 Fulani, 171, 188
 Funchal, 110, 111, 112
 Futa, Jalon, 166, 169, 178, 200, 201
- GABAIT, 147
 Gabela, 228
 Gabes, Gulf of, 20
 Gabes, oasis, 97, 99
 Gabon, 208, 211, 214, 215
 Gafsa, 98
 Gall-sickness, 51
 Galla, 154
 Gallas, 155
 Gama, Vasco da, 19
 Gambela, 148, 157
 Gambia, the, 176-178; trade, 178
 Gambia, river, 32, 39, 46, 166, 167
 Gamtoos, river, 272
 Gannets, 304, 327
 Garua, 215
 Gash, river, 140, 145, 148
 Gatooma, 298
 Gebel Aulia, 129, 132
 Gedaref, 148
 Georgetown (Ascension), 356
 Georgetown (the Gambia), 177
 German East Africa, 68
 German East African Association,
 233
 German South-West Africa, 281
 Germans, 245, 302

INDEX

Germiston, 336
 Géryville, 75
 Gezira, 128, 145, 147
 Ghadames, 108
 Gharb, 86, 87
 Ghardaia, 94
 Ghat, 108
 Ghee, 146, 164, 240, 249, 251
 Ghir, Cape, 74
 Ghurian, 107
 Ginger, 179-180, 205
 Giza 7 cotton, 133
 Glen (Orange Free State), 341
 Glencoe, 344
 Goats, 80, 163, 258, 324-325, 356
 Gobabis, 275, 301
 Gojam, 155
 Gold, 69, 184, 185, 198, 221, 242, 244, 247, 249, 258, 278, 284, 298, 300, 317; in Union of South Africa, 327, 328-329
 Gold Coast, 66, 181-187; climate and crops, 182-184; minerals, 184; towns, 186; trade, 186-187
 Gomera, 112
 Gondar, 151, 157
 Gondokoro, 116, 120
 Gondwanaland, 27
 Gordonina, 351
 Goree, 170, 198
 Gough Island, 355
 Gouritz, river, 272
 Graaff Reinet, 323, 349
 Grahamstown, 350
 Grain Coast, 56
 Grand Bassa, 205
 Grand Bassam, 201
 Grand Canary, 112, 113
 Grand Comoro, 262
 Grand Port, 266
 Graphite, 258
 Grass Ridge, 318
 Great Fish River, 272, 277
 Great Kei, river, 272
 Great Trek, the, 277, 317
 Green Mountain, 356
 Griqualand East, 351
 Griqualand West, 333, 349
 Grootfontein, 304
 Ground-nuts, 48, 146, 166, 172, 174, 176, 177, 184, 189, 193, 196, 197, 257, 283, 288, 297, 321
 Guano, 267, 304, 327

Guardafui, Cape, 26, 36, 150, 159, 164
 Guinea corn, 175, 177, 184
 Guinea Current, 35, 37, 168, 201
 Guinea, French, 200-201
 Guinea, Portuguese, 204
 Guinea, Spanish, 218
 Guinea, Gulf of, 23, 39, 168, 188
 Guinea Islands, 183
 Gulf Islands, 206
 Gwai, river, 295
 Gwelo, 299

HAIA, 148
 Half Assini, 186
 Hamada, 99, 104, 107
 Hamasien, 157
 Hamites, 53, 124
 Harar, 154, 157
 'Hardebank,' 330
 Harmattan winds, 37, 170, 174, 182
 Harris Smith, 341
 Hartebeest, river, 310, 339
 Hausa, 104, 188, 193, 200
 Haut Katanga, 216
 Hawash, river, 25, 151
 Heidelberg, 339
 Hereros, 277, 302
 Hex, river, 347
 Hides and skins, 244, 248, 249, 256, 279, 300, 323
 Hierro, 112
 High veld, 294, 324, 353
 Hill Station, 180
 Hoeman, 175
 Homra, 107
 Hookworm, 52
 Horse, 175, 325
 Horse-sickness, 280, 325, 326
 Hottentots, 54, 277, 302
 Hova, 252, 259
 Hottentots in South Africa, 317
 Hottentot, 228
 Human portrage, 178, 186, 205, 259
 Humidity, 40, 41, 170
 Hurghada, 134
 Huxley, Professor Julian, 2512.

IBADAN, 191, 193
 Ichabo Island, 304
 Ifni, 85
 Igharghar, Wadi, 100
 Ile de France (Mauritius), 264

AFRICA

Ilebo—*see* Port Francqui
 In Salah, 75, 103
 Indian Ocean, islands of (economic region), 69, 252-268; Madagascar, 252-261; Mayotte and the Comoro Islands, 261-262; the Mascarene Islands, 262-267; the Seychelles, 267-268
 Indians, 58, 162, 163, 234, 239, 244, 249, 252, 263, 264, 267, 279, 287, 293, 306, 322
 Indigo, 193
 Inhambane, 273, 275, 283
 Insect pests, 50-52
 Inyanga, 294, 296
 Iringa, 245
 Iron, 80, 84, 92, 98, 99, 175, 180, 181, 221, 284, 333, 340, 344
 Irrigation, 32, 80, 86, 90, 158, 189, 199, 282, 295, 297, 301, 304, 309, 323, 339, 346, 349; in the Nile lands, 125 *et seq.*, in the Union of South Africa, 318
 Ismailia, 139
 Isna, 126
 Italian East Africa (Abyssinia), 153-157
 Italians, 90, 95, 106, 108, 158, 160
 Ituri, 224
 Ivory, 147, 220, 233, 251
 Ivory Coast, 56, 194, 201-202

 JADOTVILLE, 220
 Jagersfontein, 330, 341
 Jamestown, 356
 Japan, 244, 251, 266, 355
 Jebba, 31, 167, 188
 Jedi, Wadi, 91
 Jefara, 107-108
Jemal, 81
 Jerba Island, 97
 Jews, 79, 90, 95, 106, 155
 Jibuti, 65, 153, 157, 162, 163
 Jinja, 237, 238
 Johannesburg, 281, 297, 314, 338, 339
 Joliba, river, 166
 Jolofs, 171, 176
 Jos, 192
 Juan de Nova, island, 262
 Juba, river, 151, 159
 Juba, town, 148, 224, 237
 Juniper-tree, 77, 152, 162

KABALO, 222
 Kabara, 31, 199
 Kabinda, 226
 Kabyles, 78, 91, 106
 Kafir corn, 288, 292, 301, 321
 Kafirs, 277
 Kafria, 351
 Kafue—*see* Sinoia-Kafue, proposed railway
 Kafue, river, 290, 293
 Kagera, river, 31, 116, 230
 Kakamega, 242
 Kairwan, 98
 Kalahari Desert, 29, 45, 48, 301, 303
 Kalahari grass-land, 276, 316
 Kalkfontein, 318
 Kaloma, 292
 Kamabai, 181
 Kambove, 220, 222
 Kampala, 224, 238
 Kanem, 105
 Kankan, 201
 Kano, 108, 170, 188, 193
 Kansanshi, 292
 Kanuri, 188
 Kaolakh, 196, 198
 Kapok, 201, 202, 246, 283
 Karakul sheep, 304, 305
 Karibib, 304
 Karité-nut, 301
 Karoo, 271, 276, 279, 303, 316, 321, 325, 326, 346, 348, 349
 Karoo basin, 24, 308
 Karst, 303
 Kasai, river, 207, 221, 222
 Kasamance, river, 197
 Kassala, 119, 142, 145, 148
 Katanga, 23, 67, 208, 210, 211, 213, 217, 219, 220, 222, 223, 224, 228, 291, 292, 297
 Katiola, 202
 Kaura Namoda, 193
 Kavirondo, 242
 Kavar, 104, 108
 Kayes, 167, 169, 170, 199
 Kebrabasa Falls, 28, 32, 282
 Kelso, 344
 Kenitra, 87
 Kenya, 25, 67, 148, 229, 232, 233, 239-244; product and settlement, 240-243; towns and commercial centres, 243-244; trade, 244
 Kenya, Mount, 25, 229, 243

INDEX

- Kenya Highlands, 58
 Kenya and Uganda Railway, 237,
 239, 243, 248
 Khamsin, 120
 Kharga, 133, 136
 Khartum, 119, 120, 121, 142, 147
 Kieselguhr, 93
 Kigoma, 248
 Kikuyu, 235, 240
 Kikuyu Highlands, 232, 241
 Kilma Njaro, Mount, 229, 232, 243,
 245
 Kilindini, 243
 Kilo-Moto, district, 221
 Kilosa, 247
 Kimberley, 24, 310, 317, 330, 336,
 349
 Kindu, 222
 King William's Town, 346, 350
 Kinshasa, 222, 224
 Kioga, Lake, 33, 116, 230, 233, 235,
 236, 237
 Kismayu, 160
 Kisumu, 237, 244
 Kivu, Lake, 207, 213, 222, 225, 245
 Knysna, 274, 315, 316, 349
 Koffyfontein, 330, 341
 Kola-nuts, 170, 176, 179, 183, 184,
 201
 Kolla, 156
 Komati, river, 309
 Komati Poort, 338
 Komoe, river, 201, 202
 Konakri, 200-201
 Kong, 202
 Kongolo, 222
 Kopje, 271, 295, 308
 Kordofan, 105, 143, 148
 Kosseir, 134
 Kosti, 119
 Kouridja, 87
 Kraals, 277, 281
 Kroonstad, 341
 Kru seamen, 171
 Kufra, 105, 107
 Kuka, 192. *See also* Dikwa
 Kulikoro, 31, 167, 175, 200
 Kumasi, 186
 Kunene, river, 28, 207, 209, 226,
 271, 303, 304
 Kuruman, 351
 Kurussa, 167, 201
 Kwanza, river, 209, 226
- LABOUR, 242-243, 362, 369-372
 La Goulette, 98
 Ladysmith, 344
 Laghuat, 94
 Lagos, 70, 148, 170, 188, 192, 202
 Lahu, 202
 Lake Kivu, 248
 Lake Plateau, 21, 24, 33, 48, 60, 67,
 116, 120, 123, 207, 229, 230
 Lake-basins of Africa, 33
 Lange Bergen, 26, 271, 348
 Lanzarote, 112
 Larache, 83, 84
 Las Palmas, 110, 113, 114
 Laterite, 166, 256, 290
 Lead, 99, 292, 304, 333
 Leikipa Highlands, 232
 Lemon grass, 236, 257
 Lemur, 256
 Leopold II, Lake, 33, 207
 Leopoldville, 23, 32, 208, 222, 224,
 225
 Leopoldville-Matadi Railway, 223
 Liberia, 28, 61, 166, 169, 171, 204-
 206
 Libreville, 45, 210, 214, 215
 Libya, 63, 71, 79, 106-109; people,
 107; climate, 107; political divi-
 sions, 107-109
 Libyan Desert, 119, 133, 140
 Libyan limestone, 118
 Lichtenburg, 331, 339
 Likumt, 72
 Limes, 184
 Limpopo, river, 24, 28, 32, 68, 271,
 272, 276, 277, 281, 282, 283, 294,
 299, 309, 337
 Lindi, 246, 248
 Livingstone, David, 29, 208, 287
 Livingstone, town, 274, 281, 292
 Livingstone Falls, 32, 208, 212, 214,
 223
 Livingstone Mountains, 232, 245
 Loanda (São Paulo de Loanda), 226,
 227
 Loangwa, river, 271, 272, 290
 Lichargula, 296
 Lichargula, 67, 213, 222, 224, 228,
 285
 Locust, 52, 124, 319
 Logone, river, 209, 214
 Lokoja, 188
 Lomé, 203

AFRICA

- Lopez, Cape, 210
 Los Islands, 201
 Lourenço Marques, 269, 282, 283, 284, 285, 310, 332, 338, 352
 Low veld, 294, 324
 Lualaba, river, 208, 222
 Luapula, river, 208
 Lucerne, crop, 319, 325, 326
 Lüderitz Bay, 274, 305
 Lugard, Frederick, Baron, 133, 362
 Lukulu, river, 33, 208, 221, 230
 Lungu, river, 296
 Lusaka, 292, 293
 Lushoto, 246
 Luxor, 136
 Lydenburg, 329, 333, 338

MAD MULLAH, 163
 Madagascar, 26, 38, 39, 46, 49, 53, 60, 68, 250, 252-261; physical conditions, 253-254; climate and vegetation, 254-256; productions, 256-258; minerals, 258, communications and towns, 259-261; trade, 261
 Madeira Islands, 110, 111
 Mafeking, 281, 301, 320, 331, 349
 Mafeteng, 353
 Mafia Island, 248
 Magadi, 242, 243
 Magdala, 156
 Maghagha, 126
 Maghreb-el-Aksa, 82
 Mahdi, the, 116, 142
 Mahé, 267
 Mahébourg, 266
 Mahmudieh Canal, 135
 Mahogany, 170, 183, 184, 189, 201, 235
 Maize, 48, 60, 86, 133, 177, 226, 234, 241, 257, 275, 279, 283, 285, 288, 290, 292, 297, 320, 337, 340, 352, 353
 Maize triangle, 320, 340
 Majuba Hill, 344
 Makarikari Salt-pans, 24, 28, 33, 270, 273, 300
 Makwar, 128
 Malagasy, 252, 256, 263, 267
 Malanje, 228
 Malaria, 50, 51, 52, 77, 80, 82, 123, 265, 352
 Malayo-Polynesians, 54, 252

 Malays, 279, 326
 Malmesbury, 348
 Maltese, 79, 82, 90, 95, 106, 326
 Maluti Mountains, 353
 Manakara, 261
 Mananjary, 261
 Manda, 247
 Mandingoes, 171, 176, 178
 Manganese, 134, 185, 333
 Mango, 178, 240, 246, 342
 Mangoky, river, 253
 Mangoro, river, 253
 Mangrove, 31, 46, 170, 178, 186, 232, 246, 248, 256, 257, 266, 275, 283
 Manica Highlands, 283, 284
 Manila hemp, 234
 Manioc, 60, 172, 257, 266, 283. *See also* Cassava
 Manufactures in the Union of South Africa, 333-334
 Manyara, 233
 Manyoni, 248
 Mao, 105
 Maquis, 77, 91
 Marampa, 180
 Marrakesh, 75, 85, 86, 87
 Masai, 234
 Masai steppe, 232
 Mascarene Islands, 256, 262-267
 Maseru, 353
 Mashonaland, 23, 271
 Mashonas, 277
 Massawa, 65, 151, 152, 156, 158, 159
 Matabele, 277, 278
 Matabeleland, 24
 Matadi, 23, 32, 208, 223, 224, 225
 Matopo Hills, 271, 299
 Mau escarpment, 232, 242
 Mauritania, 71, 73, 99, 102-103, 194
 Mauritius, 68, 70, 257, 258, 262, 264-267
 Mauritius hemp, 266
 Mayotte, 261-262
 Mayumbe, 219, 224
 Mayunga, 254, 258, 260
 Mazagan, 88
 M'babane, 352
 Mbeya, 247
 Mealies, 279, 320
 Mediterranean climate, 44, 45, 75-76, 276, 313
 Mediterranean Sea, 36

INDEX

- Mehari*, 81
 Mejerda, river, 74, 78, 96, 98
 Meknes, 85, 86, 87
 Melilla, 83, 84
 Melsetter, 288, 296, 299
 Mentz, Lake, 318, 349
 Merca, 159-160
 Merino sheep, 80, 175, 242, 324, 348
 Mersa Fatima, 158
 Meru, Mount, 245
 Messina, 299, 332, 339
 Metidja Plain, 90
 Mfumbiro, 207, 225, 229
 Mica, 248, 258, 284, 298
 Middelburg (Cape Province), 350
 Middelburg (Transvaal), 320, 323, 332, 338
 Middle Congo Colony, 213
 Millet, 48, 148, 177, 189, 197, 234, 240, 283, 288, 321. *See also* Dura
 Miner's phthisis, 329
 Misurata, 106
 Mlanje, Mount, 287, 288
 Mlanje cypress, 288
 Mocha coffee, 156
 Mogadishu, 159
 Mogador, 74, 75, 86, 88
 Mohair, 279, 325
 Mohammedanism, 56, 60, 102, 171, 188, 287
 Mohoro, 248
 Mokattam Hills, 135
 Molopo, river, 270, 300, 310
 Molteno, 350
 Mombasa, 55, 235, 237, 243
 Monrovia, 205
 Monsoon, 37, 119, 151, 159, 163, 231
 Mont aux Sources, 271, 341, 353
 Mooi, river, 339
 Moors, 79, 82
 Moramanga, 259-260
 Morocco, 26, 59, 76, 79, 82-89; Tangier zone, 82-83; Spanish zone, 83-85
 Morocco, French, 85-89; people, 85; agriculture, 86; minerals, 87; towns and railways, 87-88; trade, 89
 Morocco, town—*see* Marrakesh
 Morogoro, 248
 Moshi, 248
 Mosquito, 50, 51, 52, 212
 Mossamedes, 228
 Mossel Bay, 310, 349
 Mostaganem, 93
 Motor transport, 62, 81, 184, 192, 224, 234, 243, 259, 280, 326
 Mountains of the Moon, 230, 235
 Mozambique, 273, 280, 281-286; physical features, 282; products, 282-284; minerals, 279, 284; other economic activities, 284; ports and railways, 284-285; trade, 285-286. *See also* Portuguese East Africa
 Mozambique Channel, 252, 253, 261
 Mozambique Company, 282
 Mozambique Current, 260, 273, 274, 275
 Mufulira, 292
 Muhuga-tree, 241
 Mulberry, 258
 Mule, 80, 155, 296, 319, 326
 Muluya, Wadi, 85
 Murchison Falls, 116, 230
 Murzuk, 108
 Mwanza, 244, 248
 Mweru, Lake, 33, 208, 291
 Myrrh, 163
 Mzab, 91, 94
 NAGANA, 51, 52, 246
 Nagh Hamadi, 128, 132
 Nairobi, 232, 234, 244
 Nakuru, 238, 244
 Namaqualand, 23, 276, 303, 316, 324, 327, 331*in.*, 346
 Namasagali, 237
 Namib, 276, 303
 Natal, 26, 28, 46, 275, 277, 279, 321, 322, 333, 341-344; highlands of, 342-343; midlands of, 342, 351
 Native policy, 53, 81, 172-174, 235, 236, 242, 281, 288, 296, 305-307, 353, 358 *et seq.*
 Native reserves, 240, 281, 296, 306, 360
 Ndola, 292
 Negroes, 54, 79, 106, 124, 171, 263, 264, 265, 267
 New Antwerp, 210
 New Lisbon, 228
 Newcastle, 333, 344
 Ngami, Lake, 24, 28, 29, 33, 209, 226, 270, 273, 300
 Ngoma, 301

AFRICA

- Nguru, 193
 Niamey, 104, 167, 200
 Nickel, 333, 339
 Nieuwveld Mountains, 23, 24, 271, 307, 348
 Niger Colony, 104, 195, 200
 Niger, river, 22, 23, 27, 28, 29, 30, 31, 32, 60, 66, 165, 166, 167, 188, 196, 198, 200
 Nigeria, 31, 165, 169, 187-192; climate and vegetation, 188-190; productions, 190-191, minerals, 191-192; railways and towns, 190-193; trade, 193-194
 Nile, river, 23, 27, 30, 31, 32, 33, 50, 56, 58, 64, 65, 115 *et seq.*, 147, 230
 Nile, Albert, river, 116
 Nile, Blue, river, 117, 120, 121, 126, 151
 Nile, White, river, 117, 120, 121, 126
 Nimule, 140, 148, 230
 Nkana, 292
 No, Lake, 33, 116, 117, 120
 Norite, 294
 North-east trades, 112
 North-west Africa and the Sahara (economic conditions), 70, 71-114, 115-116, 117-118, 119-120; climate, 74-76; vegetation, 76-78; animal life, 78; people and development, 78-82; political divisions, 82-114
 North-west Africa, islands of, 110
 Nubian Desert, 119
 Nubian sandstone, 118
 Nunez, river, 200
 Nyanza province, 242
 Nyasa, Lake, 25, 33, 229, 233, 271, 272, 273, 282, 285, 287, 289
 Nyasa Company, 282
 Nyasa highlands, 274, 275
 Nyasaland, 56, 69, 269, 278, 279, 280, 281, 282, 286-289; climate, 287; productions, 287-288; towns and railways, 289; trade, 289
 Nylstroom, 339
 OAK, cork, 45, 77, 84, 86, 91
 Oases, 50, 64
 Obok, 162
 Ocean currents, 34
 Ogaden, 154, 159
 Ogowe, river, 27, 29, 209, 214, 215
 Oil, 80, 93, 133, 181, 184, 237, 251, 285
 Oil Islands, 267
 Oil-palm, 46, 170, 174, 183, 189, 206, 211, 212, 218, 224, 226, 246
 Okavango, river, 300, 303
 Okoumé, 214
 Olifants Mountains, 26, 271, 309, 313, 348
 Olifants River (Cape Province), 349
 Olifants River (Transvaal), 272, 309
 Olive-tree, 45, 77, 86, 92, 97, 98, 152, 174
 Omdurman, 148
 Onilahy, river, 253, 258, 261
 Onions, 113, 132
 Ookiep, 310, 350
 Oran, 92, 93
 Orange Free State, 277, 324, 325, 331, 340-341
 Orange River, 24, 27, 29, 32, 68, 271, 272, 303, 309, 310, 345, 350
 Orange river-flats, 350
 Oranges, 86, 92, 107, 110, 297, 323, 344, 348, 350
 Orleansville, 95
 Ostrich, 256, 326, 348, 350
 Otavi, 304
 Oudtshoorn, 349
 Oujda, 85, 88
 Ovambo, 302
 Ovamboland, 304
 Overseas communications, 69-70
 Owanet, 136
 Ox transport, 278, 296, 306, 319, 336
 PAARL, 348
 Palm belt, of Natal, 275, 315
 Palm briquettes, 190; kernel oil, 174, 179; oil, 174, 176, 179, 184, 190, 200, 202, 203, 206, 214, 215, 218; wine, 78, 174; kernels, 176, 179, 184, 190, 200, 202, 215, 218
 Palm fibre (*crin végétal*), 77
 Palma, 112
 Palmas, Cape, 166, 168, 205
 Panda—see Jadotville
 Pangalanes, Canaux des, 254, 259
 Pangani, river, 230, 245, 246
 Papyrus, 116, 300
 Paratagonia, 203
 Park, Mando, 28, 165, 175, 199
 Petchouli, 268

INDEX

Pearling, 158
 Pemba, island, 250
 Pemba (Northern Rhodesia), 292
 Pendembu, 181
 Peoples of Africa, 53-56
 Pepel, 180
 Perennial irrigation, 126
 Pericarp, of fruit of oil-palm, 174, 179, 190
 Perregaux, 95
 Petit Jean, 87
 Petroleum, 134, 251, 284. *See also* Oil
 Philæ, 136
 Philippeville, 91, 93
 Phosphates, 80, 87, 93, 97, 133, 262, 268
 Piassava, 176, 180, 184, 205, 214
 See also Raffia
 Pico, 110
 Pico Ruivo, 111
 Piet Retief, 338
 Pietermaritzburg, 342, 344
 Pietersburg, 332, 339
 Pigs, 258, 297, 325
 Pineapple, 111, 200, 268, 283, 323, 350
 Piton de la Fournaise, 263
 Piton des Neiges, 263
 Piton de la Rivière Noire, 264
 Plantain, 211, 218, 236
 Platinum, 180, 298, 333, 338, 339
 Pointe des Galets, 264
 Pointe Noire, 214, 215
 Pondoland, 350, 351
 Pongola, river, 344
 Ponta Delgada, 110, 111
 Ponthierville, 222
 Population, density of, 58-60, 358
 Port Alfred, 350
 Port Bell, 234, 238
 Port Elizabeth, 274, 277, 309, 324, 333, 349
 Port Etienne, 103
 Port Francqui, 222, 223, 224
 Port Fuad, 139
 Port Gentil, 215
 Port Harcourt, 191, 193
 Port Herald, 287
 Port Louis, 266
 Port Lyautey, 87
 Port Natal, 277
 Port Nolloth, 310, 331, 350
 Port Said, 70, 134, 137, 138, 139

Port St Johns, 350
 Port Savanna, 206
 Port Shepstone, 321, 344
 Port Sudan, 65, 70, 146, 147, 148
 Port Victoria, 268
 Porto Amboim, 227, 228
 Porto Novo, 202
 Porto Santo, 111
 Portuguese, the, 56, 60, 79, 165, 172, 211, 233, 243, 262, 278, 282
 Portuguese East Africa, 68, 69, 269, 281, 337 *See also* Mozambique
 Portuguese West Africa—*see* Angola
 Postmasburg, 333
 Potash, 156, 158
 Potchefstroom, 335, 339
 Potgietersrust, 333
 Praia, 204
 Praslin, 267, 268
 Premier Mine, near Pretoria, 330, 339
 Pretoria, 274, 281, 307, 310, 330, 333, 334, 339
 Prieska, 310, 333, 350
 Principe, 22, 206
 Providence Island, 267
 Puerto de la Luiz, 113
 Pulses, 133, 146
 Pygmies, 54, 124, 211
 Pyrethrum, 242, 244
 QUATHLAMBA MOUNTAINS, 307, 308
 341, 353
 Queenstown, 350
 Quelimane, 273, 283, 285
 RABAT, 86, 87
 Radium, 220, 225
 Raffia, 255, 257, 259. *See also* Piassava
 Railways, 62. *See also under the different economic and political divisions*
 Rand, 24, 279, 284, 317, 328, 329, 331, 338, 344, 349. *See also* Witwatersrand
 Randfontein, 329
 Ras Dashan, 150
 Red Sea, 21, 25, 38, 65, 138, 141, 151, 153, 163
 Reg, 99, 104
 Relief of Africa, 20-27
 Religions of Africa, 56
 Réunion, 68, 257, 258, 262-264

AFRICA

- Rhodes, Cecil, 281, 299
Rhodesia, 22, 69, 269, 274, 275, 276, 277, 279, 281, 282, 284, 289-300
Rhodesia, Northern, 269, 289, 290-293; trade, 293
Rhodesia, Southern, 269, 293-300; physical features, 294-295; climate and vegetation, 295-296; productions, 296-297; mining, 297-299; towns and railways, 299, trade, 299-300
Rice, 46, 133, 178, 179, 197, 200, 219, 240, 246, 249, 251, 257, 266
Riet, river, 340
Rif, 26, 72, 82, 83
Rift Valley, 24-25, 33, 60, 67, 150, 207, 225, 229, 230, 233, 244, 271, 273, 287
Rima, river, 188
Rinderpest, 51, 236, 246, 280, 296
Rio Martin, 85
Rio Muni, 216
Rio de Oro, 109
Ripon Falls, 116, 230, 237
Roan Antelope, 292
"Roaring Forties," 36, 38
Robertson, 348
Rodriguez Islands, 262, 267
Rokelle, river, 168, 178, 180
Ropp, 192
Rorke's Drift, 344
Roseires, 148
Rosetta, 118, 122, 135, 136
Rosewood, 255, 257
Rovuma, river, 230, 233, 281
Ruanda Urundi district, 222
Rubber, 46, 67, 147, 155, 170, 174, 176, 189, 205, 211, 212, 216, 219, 226, 246, 255, 283
Rudolf, Lake, 25, 33, 150, 151, 229, 230, 233
Rufiji, river, 32, 230, 246
Rufisque, 196
Rustenburg, 321, 323, 333, 339
Ruwenzori, Mount, 116, 230, 235

SAATI, 158
Sabi, river, 294, 296
Safi, 87, 88
Sahara, 29, 36, 39, 45, 49, 50, 53, 59, 63-64, 66, 71, 73, 75, 99-102, 112; routes in, 105-106
Sahara, French, 99-106; physical features, 99-100; climate, 101; people, 101-102; political divisions, 102-106
Sahel Plain, 96, 97
Sahel ranges, 72, 90
St Benoît, 264
St Brandon, 267
St Denis, 264
St Helena, 356
St John, river, 205
St Louis, 197-198
St Mary Island, 257
St Mary's Island, 176
St Paul, river, 205
St Paul, town, 264
St Pierre, 264
St Vincent, 204
Sakel cotton, 133, 144, 175
Sakiyeh, 125
Saldanha Bay, 273, 310, 346, 348
Salisbury, 295, 297, 299
Salt, 102, 104, 108, 109, 147, 158, 161, 175, 192, 197, 248, 284, 333, 349
Saltpond, 186
Salum, river, 197, 198
Sanaga, river, 209, 215
Sankishia, 221
Sansanding, 198
Santa Cruz, 113, 114
Santa Isabel, 206, 216
Santiago, 204
São Miguel, 110, 111
São Paulo de Loando, 226, 227
São Thomé, 22, 206
Sargasso, 204
Saura, Wadi, 100
Savanna, 47, 166
Savanna forest, 171, 178, 276, 296
Savé, 203
Savoka, 256
Scab, 51, 343
Scarcies, Great, river, 178
Scarcies, Little, river, 178
Schwarz, Professor, 301
Sebka, 103
Sebka d'Oran, 90
Sebu, Wadi, 73, 85, 86
Segregation, 306
Segu, 195, 198
Sekondi, 182, 185, 186
Selukwe, 298, 299
Semites, 53, 54, 124, 154
Semliki, river, 116, 124, 230

INDEX

- Sena, 286
 Senegal, colony, 194, 195, 196-198
 Senegal, river, 22, 27, 28, 32, 166, 167, 197, 199
 Senegambia, 169
 Sennar, 128, 145, 148
 Senussi, 107, 136
 Sericulture, 258
 Serowe, 301
 Sesame, 146, 159, 234. *See also* Simsim
 Setif, 93
 Seychelles, 267-268
 Sfax, 98
 Shabani, 298
 Shaduf, 125, 166, 190
 Shamva, 297
 Shari, river, 32, 209, 213, 214
 Shawiya Berbers, 78
 Shea-nut, 171, 175, 184, 189
 Sheep, 80, 86, 92, 146, 155, 163, 164, 175, 191, 225, 242, 247, 258, 280, 297, 304, 324, 341, 343, 349, 350, 351, 352, 353
 Shellal, 136
 Sherbro Islands, 178, 180
 Shiré Railway, 287
 Shiré, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000
 Shiré, river, 25, 33, 271, 272, 273, 287
 Shirwa, Lake, 287
 Shoa, 155, 156
 Shott el Hodna, 72, 91
 Shott el Jerid, 22, 27, 96, 97, 98
 Shott Melghir, 73, 91, 96
 Shotts Plateau, 26, 49, 63, 72, 73, 75, 76, 77, 87
 Sidamo, 154
 Sidra, Gulf of, 20, 106
 Sierra Leone, 28, 166, 169, 171, 174, 178-181, 205; crops, 178-180; minerals, 180; towns and communications, 180; trade, 181
 Sig Plain, 90
 Silk, 92
 Silver, 298, 333
 Simonstown, 348
 Simsim, 237, 240, 246, 249, 251, 283.
See also Sesame
 Singidi, 248
 Sinoia, 295, 297
 Sinoia-Kafue, proposed railway, 285, 286, 293, 299
 Sirocco, 76
 Sisal, 68, 102, 183, 184, 199, 219, 234, 241, 244, 246, 248, 258, 266, 280, 283, 288
 Siwa, 133, 136
 Six Islands, 267
 Skeenkamps Berg, 337
 Slave Coast, 57
 Slave-trade, 56, 57, 60, 79, 81, 102, 105, 155, 165, 172, 177, 199, 211, 278, 287
 Sleeping sickness, 51, 52, 123, 216, 236, 238
 Sneezewood, 315
 Sobat, river, 117, 120, 148
 Socotra, 164
 Sofala, 285
 Soil deficiency, 320, 321
 Soil erosion, 45, 353, 366-369
 Sokoto, 191, 193
 Sollum, 136
 Somali Protectorate, 25, 39, 150
 Somaliland, British, 162-164
 Somaliland, French, 162-163
 Somaliland, Italian, 67, 151, 159-162
 Somalis, 153, 154, 163
 Somerset West, 348
 Somkele, 344
 Sorghum, 321
 Soroti, 238
 Sotuba barrage, 198
 Souillac, 266
 South Africa (economic region), 68, 269-357; physical conditions, 270-273; climate, 273-275; vegetation and animals, 275-276; population and races, 277-278; development, 278-281; political divisions, 281-357
 South Africa, Union of, 61, 68, 69, 269, 275, 278, 280, 305-355; people, 305-307; physical conditions, 307-310; climate, 310-314; vegetation, 314-316; development, 316-317; water-supply and irrigation, 317-319; cultivation, 319-323; stock-rearing, 323-326; fishing, 326-327; mining, 327-328; gold, 328-329; diamonds, 329-331, coal, 331-332; other minerals, 332-333; manufacturing industries, 333-335; communications, 335-337; Transvaal, 337-340; Orange Free

AFRICA

- State, 340-341; Natal, 341-344;
Cape of Good Hope, 346-351,
Transkei Territories, 351, Swazi-
land, 351-352, Basutoland, 353;
trade, 352-355
- South-east trades, 39, 254
- South-West Africa, 35, 45, 69, 269,
274, 276, 278, 281, 301-305; phy-
sical features and climate, 303;
productions, 303-304, towns and
railways, 304-305; trade, 305
- Spaniards, 79, 82, 85, 89
- Sponges, 108, 109
- Springbok Flats, 339
- Springfontein, 341
- Springs, town, 320, 329, 332, 338
- Standerton, 339
- Stanger, 322, 344
- Stanley, H. M., 208, 216
- Stanley Falls, 32, 208
- Stanley Pool, 207, 208, 224
- Stanleville, 222, 224
- Star of the Congo, copper-mine, 219
- Stellenbosch, 348
- Stephanie, Lake, 33, 151
- Stinkwood, 275, 315, 350
- Storm Bergen, 271, 331
- Stormberg beds, 270, 308
- Strophanthus, 288
- Structure of Africa, 20-27
- Suakin, 21, 148
- Sudan, 29, 31, 39, 48, 59, 123, 166
- Sudan, Anglo-Egyptian *See* Anglo-
Egyptian Sudan
- Sudan, French, 194, 198-200
- Sudan negroes, 54, 66, 124, 171
- Sudan Plantations Syndicate, 146
- Sudan Road, 237
- Sudd, 31, 116
- Suez, town, 134, 137, 139
- Suez Canal, 65, 130, 137, 138-139
- Sugar, 132, 134, 155, 206, 227, 237,
240, 242, 246, 251, 257, 262, 263,
265, 280, 283, 321-322, 344
- Sunday River, 349
- Surf, 168, 182, 263
- Sus, Wadi, 72
- Susa, 98
- Swahili, 235
- Swakopmund, 273, 303, 304
- Swaziland, 281, 284, 320, 332, 351
- Swedes, the, 165
- Sweet potatoes, 175, 180, 288
- Sweet Water Canal, 139
- Swellendam, 348
- TABLE BAY, 30, 56, 273, 277, 319,
327, 346-347
- Table Mountain, 347
- Table Mountain Sandstone, 270, 309
- Tabora, 232, 234, 246, 248
- Tafassasct, Wadi, 100
- Taficlt, 88
- Tafna, Wadi, 92
- Taia, river, 178
- Tajura, 162
- Takoradi, 182, 186
- Tamale, 186
- Tamarida, 164
- Tamatave, 253, 254, 255, 258, 259
- Tana, Lake, 117, 122, 129, 151, 152
- Tana, river, 230, 240
- Tanezruft, 99
- Tanga, 245, 248
- Tanganyika, Lake, 25, 33, 208, 222,
224, 225, 229, 230, 233, 291
- Tanganyika Central Railway, 222,
234, 245, 248
- Tanganyika Highlands, 58, 210, 211
- Tanganyika Territory, 67, 229, 233,
245-249; productions, 245-246;
towns and communications, 248-
249; trade, 249, 251
- Tangier, 76, 81, 82-83
- Tannin, 170, 188, 256
- Taodeni, 104
- Tarka, 318
- Tarso Mountains, 104
- Taru jungle, 232
- Tasili, 22, 73
- Tati, 301
- Taxation, 360-361
- Taza, 88
- Tea, 241, 244, 246, 257, 266, 288,
322, 344
- Tebessa, 93, 94
- Tell, the, 72, 90, 91, 96
- Tembuland, 351
- Tenerife, 112, 113
- Tenke, 222
- Tensift, Wadi, 85, 87
- Termites. *See* White ant
- Tété, 28, 272, 282, 284
- Tetuan, 83, 84
- Textiles, 95, 99, 134, 301
- Thebes (Egypt), 136

INDEX

- Thompson Island, 357
 Thuy, Cape, 168, 182
 Thuya, tree, 77
 Thysville, 223
 Tibbu, 101
 Tibesti, 22, 39, 73, 101, 104, 107
 Tigre, 154, 159
 Timbo, 201
 Timbaktu, 29, 31, 33, 169, 170, 198
 Timgad, 94
 Tin, 191, 221, 237, 248, 249, 298, 305, 352
 Tlemcen, 94
 Tobacco, 48, 92, 134, 166, 172, 226, 227, 242, 251, 257, 279-280, 283, 285, 288, 292, 297, 348
 Togoland, 187; French-mandated, 203, 300, 319, 321-322
 Tokar, 145
 Tomatoes, 92, 113, 132, 319
 Toro plateau, 235
 Tororo, 238
 Tortoiseshell, 268
 Toto Azime Falls, 309
 Tourist industry in Africa, 81, 111, 134, 299, 348
 Tozeur, 98
 Trade, 56, 57, 61. *See also under the different political divisions*
 Trans-Juba, 159
 Trans-Sahara Railway, 81, 106, 202
 Transhumance, 316, 343
 Transkei Territories, 281, 346, 350, 351
 Transport, 62
 Transvaal, 69, 269, 277, 279, 281, 284, 285, 309, 317, 323, 333, 335, 337-340
 Trawlers, 327
 Tre pang, 268
 Tripoli, 74, 104, 106, 108
 Tripolitania, 106, 107
 Tristan da Cunha, 348, 355, 356-357
 Trois Frères, 267
 Tsaratanana, 253
 Tsetse fly, 50, 51, 52, 123, 166, 180, 206, 212, 219, 236, 249, 280, 284, 288, 291, 294, 326, 344, 366
 Tsumeb, 304
 Tuareg, 53, 54, 78, 101, 104
 Tuat, 22, 73, 103
 Tugela, river, 272, 309, 341
 Tuggurt, 94
 Tukuyu Highlands, 245
 Tuléar, 258, 261
 Tumba, Lake, 207
 Tungsten, 298
 Tunis, 74, 95, 98
 Tunisia, 26, 59, 76, 95-99; physical features, 96; productions, 97-98; towns and railways, 98-99
 Turner's Peninsula, 180
 UASIN GISHU PLATEAU, 232
 Ubangi, river, 29, 207, 209, 214, 215
 Ubangi-Shari Colony, 213, 214, 215
 Udi, 191, 193
 Uganda, 51, 56, 68, 123, 124, 148, 233, 235-238; climate and productions, 235-237; towns and communications, 237-238, trade, 238
 Uitenhage, 334, 349
 Ujiji, 248
 Um er Rabia, Wadi, 85
 Umbogintwini, 333, 344
 Umgeni, river, 343
 Umtali, 298, 299
 Umtata, 351
 Union Minière de Haut Katanga, 221
 Unzimkulu, river, 272
 Upington, 272, 274, 332, 350
 Uranium, 221
 Urundi, 222, 225-226
 Usambara, district, 232
 Usambara Railway, 233, 248
 Utica, 78
 Utrecht, 331, 344
 VAAL, river, 24, 29, 272, 310, 330; barrage on, 330, 341
 Vaalbank, 318
 Vaccine, 175
 Van Rhyn's Dorp, 348
 Van Rhynveld's Pass, 318, 349
 Van Riebeeck, Jan, 316
 Vanadic oxide, 293
 Vanadium, 292, 304
 Vanilla, 202, 214, 257, 261, 262, 264, 266, 268
 Veld, 48, 274, 277, 288, 315, 317, 337
 Verde, Cape, 168, 169, 198
 Vereeniging, 332, 333, 340
 Victoria (Cameroons), 193
 Victoria (French Guinea), 200

AFRICA

- Victoria (Southern Rhodesia), 297, 298, 299
 Victoria, Lake, 25, 31, 33, 54, 123, 230, 231, 235, 238, 248
 Victoria Falls, 24, 28, 29, 32, 272, 275, 292, 299, 333
 Vila Nova, 228
 Villa Cisneros, 109
 Villaggio Duca degli Abruzzi, 159
 Vine, 49, 80, 82, 86, 92, 97, 113, 316, 319, 323
 Vittorio d'Africa, 159
 Vlei, 33, 273
 Vohémar, 261
 Voi, 243, 248
 Voina Dega, 156, 160
 Volta, river, 27, 28, 32, 166, 167, 181, 182
 Vryburg, 349
 Vryheid, 344

 WAD MEDANI, 146
 Wadai, 102, 105
 Wadelai, 118
 Wadi Halfa, 122, 140, 148
 Wagaduga, 106, 195, 202
 Wagadugha, 335, 341
 Wagadugha, 273, 274, 278, 298, 301, 304
 Wankie, 221, 298, 301
 War Mountains, 73
 Wargla, 94
 Warrenton, 349
 Waterberg, 321, 323
 Water-power, 32, 192, 219, 259, 333
 Wattle, 240, 315, 342, 344
 Wau, 148
 Webi Shebeli, 151, 159
 Welle, river, 207, 217, 218, 224
 Wellington (Cape Province), 348
 Weme, river, 202
 Wenza, 93
 Wepener, 341
 West Africa (economic region), 65-67, 165-206; physical conditions, 166-168; climate, 169-170; vegetation, 170-171; development, 171-176; political divisions, 176-206
 West Nicholson, 295, 299
 Whaling, 278, 304, 327
 Wheat, 45, 80, 82, 86, 91, 97, 125, 132, 133, 198, 241, 297, 320, 321, 346, 353
 White ant, 52, 124, 283, 288, 350
 White Nile, river, 117, 120, 121, 126
 White settlement in Africa, 58, 68, 169, 172, 213, 231, 234, 235, 240, 245, 248, 279, 287, 295, 296, 297, 299, 314, 316, 358
 Windhoek, 273, 275, 303, 304
 Winneba, 186
 Witbank, 338
 Witwatersrand, 308, 309, 337, 338.
 See also Rand
 Wolfram, 298
 Worcester, 348

 YARBATENDA, 176
 Yaunde, 215
 Yellow fever, 51
 Yellow ground, 330
 Yellow-wood, 315, 350
 Ylang-ylang, 257, 262
 Yobe, river, 32, 188, 189
 Yola, 32, 167, 186, 215
 Yoruba, 171, 187, 191, 193

 ZAMBEZI, river, 24, 27, 28, 29, 30, 31, 32, 33, 48, 60, 68, 209, 226, 271-272, 275, 282, 283, 290, 293, 294, 295; proposed railway-bridge over, 284, 289
 Zanzibar, 36, 55, 68, 229, 247, 249-251; productions, 250; trade, 250-251
 Zaria, 191, 193
 Zebu cattle, 104, 166, 175, 184, 195, 236, 240, 258
 Zeerust, 339
 Zeidab, 144
 Zeila, 163
 Zifta, 126
 Ziginkor, 198
 Zimbabwe, 283, 297, 299
 Zinc, 285, 292
 Zinder, 104, 200
 Zomba, 287, 289
 Zoutpansberg, 271, 309, 323, 333, 337, 339
 Zululand, 276, 321, 342, 341, 344
 Zulus, 51, 55, 277, 351
 Zumbo, 272, 282
 Zwarte Bergen, 26, 271